FACULTY OF SCIENCE
TANTA UNIVERSITY

1969

POSTGRADUATE

PROGRAM AND COURSE SPSECIFICATION

Volume (2)

GEOLOGY - BOTANY - ZOOLOGY

2014/2015

وحـــدة ضمـان الجــودة
كلية العلوم - جامعة طنطا
QUALITY ASSURANCE UNIT
FACULTY OF SCIENCE - TU

Postgraduate

Program and Course Specifications

Volume (2)

Geology – Zoology - Botany

2014-2015

TO WHOM IT MAY CONCERN

This is an approved copy of the Program and course specifications of the Post-graduate Program offered by, Faculty of Science, Tanta University, for the academic year 2014-2015.

Vice Dean of the Faculty
for Education and Student Affairs

Prof. Ebrahem Abdallah Younes

Dean of The Faculty

Prof. Tarek A. Fayed

شكر وتقدير

الى السيد الأستاذ الدكتور/ عميد الكلية

والسيد الأستاذ الدكتور/ وكيل الكلية لشئون الدراسات العليا والبحوث

والسيد الاستاذ الدكتور رؤساء/ قسم الجيولوجيا – علم الحيوان - النبات

والسيد الاستاذ الدكتور مدير/ وحدة ضمان الجودة

والسادة الزملاء أعضاء هيئة التدريس بوحدة ضمان الجودة

والسادة الزملاء أعضاء هيئة التدريس بالأقسام المذكورة

والذين لولا جهدهم الوفير لما أمكن إتمام هذا العمل

Postgraduate

Program and Course Specifications

Volume (2)

Geology – Zoology - Botany

Teamwork

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Postgraduate

Program and Course Specifications

Geology

2014-2015

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Academic Standards for the M.Sc. of Geology

The Academic Reference Standards for the award of the M.Sc. degree in Geology as well the attributes and capabilities of the graduate were based on the General Academic Reference Standards (ARS) for graduate studies published by the National Authority for Quality Assurance and Accreditation of Education for M.Sc. degree. The following Specific Academic Standards for the **M.Sc. of Geology** were approved by the Council of the physics department, on 28/12/2014.

- ## Graduate Attributes

The M.Sc. graduate of Geology must have the ability to:

1. Apply the knowledge of geology, its related disciplines, applications and tools to the solution of the scientific research problems in one of the available fields of research in the physics department such as: Rock petrology, Mineralogy, Geochemistry, Stratigraphy, Paleontology, Hydrogeology, Applied geology, Geological information systems, Geophysics, Petroleum geology and Environmental geology.

2. Gain new knowledge and continually enhance information to improve the understanding and handling issues in one of the different branches of Geology.

3. Participate in the development and implementation of Geological study in the professional practice.

4. Participate in university and community development.

5. Share in multidisciplinary team work and have the ability to work under contradictory conditions.

6. Hold professional values that maintain individuality, positive thinking and self-confidence.

7. Collect, summarize and present data, undertake professional and ethical responsibilities.

8. Use modern technology effectively and develop professional skills.

A. Knowledge and understanding:

By the end of the master's program, graduate must be able to:

A1. Explain theories and fundamentals of physical and historical geology as well as in related and supporting areas.

A2. Recognize mutual influence between professional practice and its impacts on the environment.

A3. Demonstrate scientific developments in all fields of geological researches such as Mineralogy, Geochemistry, Stratigraphy, Paleontology, Hydrogeology, Applied geology, Petroleum geology and Environmental geology

A4. Recognize the basics and ethics of scientific research in geology.

B. Intellectual skills

By the end of the master's program, graduate must be able to:

B1. Analyze and evaluate results the in one field of geological researches.

B2. Solve specialized problems in the different geological fields.

B3. Conduct a research study and / or write a methodology of a scientific study on a research problem in the geology field.

B4. Evaluate risk in professional practices in the geology field.

B5. Plan to improve performance in the geology field.
B6. Make professional decision in diverse professional contexts.

C. Professional skills:

By the end of the study master's program, graduate must be able to:

C1. Recognize modern professional basic skills in the geology field.
C2. Write and evaluate professional reports.
C3. Evaluate and use methods and tools in the different geological fields.

D. General and transferable skills:

By the end of the study master's program, graduate must be able to:

D1. Effectively communicate in different forms.
D2. Use of information technology to serve the professional practice.
D3. Self-evaluate and identify personal learning needs.
D4. Use different sources for acquire information and knowledge.
D5. Develop rules and indicators for assessing the performance of others.
D6. Work in a team, and lead teams in various professional contexts.
D7. Manage time efficiently.
D8. Enhance self- and continuous learning in the different geological fields

Diploma Program
of
Applied Geology

A. Programme Specification

Programme Title	**Diploma of Applied Geology**
Award	**Diploma of Applied Geology**
Parent Department	**Geology Department**
Teaching Institution	**Faculty of Science – TU**
Awarding Institution	**Tanta University**
Coordinator	**Prof. Ibrahim A. Salem**
External Evaluator(s)	**Prof. Salah N. Ayad, Professor of Geology, Faculty of Science, Mansura University.**
QAA Benchmarking Standards	**Academic Reference Standards (ARS)**
Other Reference Points	
Date of delivery	**Every year in September**
Review Date	**Internal Periodic Review, Summer 2014**
Date of Approval	**September, 2014**

1. Aims

- To provide a sound basis of knowledge and understanding for the study the Geological Sciences applying to the natural environment and industry.
- To recognize applicable theories for the interpretation of geological information.
- To develop practical and professional skills to the analysis of the geological data in a responsible and safe manner, paying due attention to risk assessment, rights of access, relevant health and safety regulations, and sensitivity to the impact of investigations on the environment and stakeholders.
- To provide general skills in learning, information technology, data processing and communication appropriate to any subsequent employment
- To develop an attitude of professional competence, and to provide the foundation for a career as a professional Applied Geologist.

2. Intended Learning outcomes

A. Knowledge and understanding:

On successful completion a graduate should have developed:

A1. A coherent, detailed and multi-disciplinary knowledge of Applied Geology, at least some of which is at, or informed by, the forefront of knowledge in the discipline, both from an academic and industrial standpoint.

A2. An understanding of geological processes related to the formation of Earth's natural resources and their exploitation by industry.

A3. A detailed knowledge of the terminology, nomenclature and classification systems used in a range of applied geological disciplines.

A4. An appreciation of uncertainty, ambiguity and the limits of knowledge applicable to a range of applied geological disciplines.

B. Intellectual skills:

They will also acquire the ability to:

B1. Write a hypothesis, plan and execute laboratory investigation or development work, evaluate the outcomes and draw valid conclusions.

B2. Analyze subject knowledge and understanding to find solutions to a range of applied geological problems.

B3. Critically evaluate the published literature.

B4. Compose theory and practice.

C. Professional and practical skills:

C1. Select and apply appropriate applied geological techniques to the collection, analysis, and presentation of applied geological information. Store, collect–and report data of laboratory and field investigations.

C2. Undertake laboratory and field investigations in a liable and safe paying due attention to risk assessment, rights of access, relevant health and safety regulations, and sensitivity to the impact of investigations on the environment and stakeholders.

C3. Conduct various forms of laboratory and field investigations in specific, precise and accurate manner.

D. General and transferable skills:

D1. able to communicate information, ideas, problems and solutions

D2. Apply numerical and IT skills with confidence and accuracy.

D3. Work both independently and in collaboration with others.

D4. Take responsibility for self-managed learning and personal/professional development.

3. Academic standards

3.A External references for standards (Benchmarks):

Academic reference standards (ARS)

3.B Comparison of provision to external references:

International Academic Standards.

Academic Reference Standards:

The academic reference standards of the program of Diploma of Applied Geology are based upon the General Academic Reference Standards (ARS) published by the National Authority of Quality Assurance and Accreditation of Education (NAQAAE, 2009) for graduate studies of basics science. The following Specific Academic Reference Standards of the program of Diploma of Applied Geology were adopted by the Department of Geology, Faculty of Science, Tanta University and were approved by the Faculty Council in 20/11/2012

Specific Academic Reference Standards

3.1 Graduate Attributes

The graduates must be able to:

1.1. Develop applied geological approaches that meet natural environment and industry needs

1.2. Utilize scientific facts and theories to analyze and interpret geological information.

1.3. Apply practical and professional skills to to the analysis of the geological data in a responsible safe and ethical manner

1.4. Provide general skills in learning, information technology, data processing and communication

1.5. To provide the foundation for a career as a professional Applied Geologist.

3.2. Knowledge and Understanding

On successful completion a graduate should have developed:

2.1. Detailed knowledge of Applied Geology from an academic and industrial standpoint.

2.2. An understanding of Earth's processes related to the natural resources and their exploitation by industry.

3.3. A detailed knowledge of the terminology, nomenclature and classification systems used in applied geology issues.

3.4. An increase of the limits of knowledge applicable to applied geological disciplines.

3.3. Intellectual Skills

The graduates must be able to:

3.1. Compose hypothesis, plan and perform investigation work, evaluate the outcomes and find conclusions.

3.2. Analyze the data to find solutions of problems.

3.3. Critically assess published works in the field of applied geology.

3.4. Combine theoretical information and practical ones

3.4. Practical and Professional Skills

The graduates must be able to:

4.1. Apply proper geological techniques to the collection, processing of applied geological information and report data of laboratory and field investigations.

4.2. Use laboratory and field investigations in a responsible and safe considering.

4.3. Proceeding laboratory and field investigations in accurate manner.

3.5. General and Transferable Skills

The graduates must be able to:

5.1. Communicate effectively in different ways

5.2. Use information and communication technology with confidence and accuracy.

5.3. Think independently, set tasks and responsibilities.

5.4. consider the self-managed learning and personal/professional development.

4. Curriculum Structure and contents:

4.A	Programme duration		One Year					
4.B	Programme structure							
4.B.1	Number of contact hours		per Week:					
		First term:	Lectures	13	Lab.	10	Total	18
		Second term:	Lectures	13	Lab.	10	Total	18
	Overall	Contact hours	Lectures	26	Lab.	20	Total	36
4.B.2	Number of contact hours		Compulsory	26	Optional	None	Optional	None

5. Programme courses

Year 1	Course Title	Lec.	Prac.	Exer.
Code	Student must do the following modules	Hours		
2031	Hydrogeology Subsurface Geology Ore Microscopy	2 1 1	3	
2032	Geology of Ore deposits Ore Exploration Mining Geology	2 1 1	3	
2033	Structural Geology Economic Minerals Photogeology Nuclear Geology	1 1 1 1	3	
2034	Computer	1	1	
1618	Statistics	1		

6. Programme admission requirements

Arrangements for admission are based on the national guidelines with no Faculty control on the number of newly enrolled students.

Candidates must satisfy the general admission requirements of the University, Faculty and Geology Department and also hold one of the following:

- B. Sc. in Geology and its equivalent

7. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression:

- This program is offered through two semesters over one year.
- Assessment is held in the end of the second semester and student will be eligible only on attaining pass degree (60%)
- Student who fails 1 or 2 courses must attend a resit exam at final examination

Students who fail more than two courses at the first attempt will be eligible only for a "Pass" degree following any reset examinations in all courses

8. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Not applied yet	
2. Alumni	Not applied yet	
3. Stakeholders(Employers)	Not applied yet	
4. External Evaluator(s)(External Examiner(s))	Evaluation in May 2014 by Prof. Salah N. Ayad, Mansura University	

We certify that all of the information required to deliver this programme is contained in the above specification and will be implemented. All course specifications for this program are in place.

Name	Signature	Date
Programme Coordinator: Prof. Ibrahim A. Salem أ. د. أبراهيم عبد الناجي سالم	……..……..………..………	/9/2014
Head of Quality Assurance Unit: Prof. Hoda Kamal أ.د. هدى كمال	……..……..………..………	/9/2014
Dean of the Faculty: Prof. Tarek Abd elmoniem Fayed أ.د. طارق عبد المنعم فايد	……..……..………..………	/9/2014

Programme Courses– Programme ILOs Matrix

Courses	Programme outcomes ILOs														
	Knowledge and Understanding				Intellectual				Practical			Transferable			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
2031 Ore microscopy Hydrogeology Subsurface geology	☒	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☐	☐	☐
2032 Mining geology Economic ores Geochemical exploration	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐
2033 Nuclear geology Economic minerals Photogeology Structural geology	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐
1618 Statistics	☐	☐	☒	☒	☒	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐
2034 computer	☐	☐	☐	☒	☐	☒	☐	☒	☒	☐	☒	☐	☐	☐	☐

Course Title	**Hydrogeology**	
	Subsurface Geology	
	Ore Microscopy	
Course Code	**2031**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Ibrahim A. Salem**	
Other Staff	**Prof. Bothina T. El Dousky, Prof. Zenhom E. Salem**	
	Dr Shadia Abdel Rahim	
Level	**Diploma Degree**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. Geology**	
Course Delivery	**Lecture**	**28 x4h**
	Practical	**28 x 3h**
Parent Department	**Geology**	
Date of Approval	**September, 2014**	

1. Aims

This course is in three parts.

The first part aims to

- Enable students to acquire knowledge and understanding of groundwater with emphasis on water supplying, groundwater flow and chemistry.

The second part aims to

Enable students to acquire knowledge and understanding of the subsurface basins.

The third part aims to

. Enable students to acquire knowledge and understanding of the techniques of ore microscopy

Enable students to acquire knowledge and understanding of the ore textures, trace and rare earth elements compositions, paragensis and fluid inclusions whether for the purposes of understanding conditions of ore formation or to ascertain the possible economic value of the deposit.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this course students should acquire knowledge and understanding of:

A1. Aquifer characteristics groundwater flow and transportation of contaminants.

A2. Subsurface basins, depositional environments and facies with an increased limit of the knowledge.

A3. Classification and nomenclature of the ore textures, trace, rare earth elements and isotope compositions, parageneses of ore minerals and types of fluid inclusions in ores.

A4.

B. Intellectual skills:

They will also acquire the ability to:

B1. Evaluate and analyze hydrological systems and processes at wide range of scales in both space and time for the purpose of water resources assessment and construct models of the recharging, flow and flow path of groundwater, with special emphasize on groundwater in Egypt.

B2. Combine subsurface data for correlation, modeling structures and tectonics of the deposition basins.

B3. Interpret conditions of the ore genesis, and ascertain the possible economic value of the deposit.

C. Professional and practical skills:

Students will be able to:

C1. Draw the hydrogeological maps and estimate the aquifer characteristics and water quality in accurate manner.

C2. Define facies changes and draw subsurface maps and sections.

D. General and transferable skills:

D1. Write reports and give oral representation.

D2. Use PC packages to write, plot and present information with confidence and accuracy

D3. Appreciate the self-managed learning and personal/professional development.

D4. Think independently and set tasks and responsibilities in a team.

3. Contents

Part –1	**Hydrogeology** (Two hours/week)
Lectures 1, 2	Hydrologic cycle and hydrologic budget
Lectures 3-6	Run off and stream flow
Lectures 7-10	Aquifer characteristics
Lectures 11,12	Principles of groundwater
Lectures 13,14	Water wells
Lectures 15-18	Water chemistry and water quality
Lectures 19,20	Groundwater pollution, contaminate transport
Lectures 21,22	Investigation of groundwater
Lectures 23,24	Groundwater modeling
Lectures 25,28	Hydrogeology of Egypt
Part- 2	**Subsurface Geology** (An hour/week)
Lecture 1	Introduction
Lectures 2-4	Information needed for subsurface work

Lectures 5-8	Source of information for subsurface work
Lectures 9,10	Correlation
Lectures 11,12	Facies
Lectures 13,14	Depositional environments
Lectures 15-18	Basin analysis
Lectures 19-22	Application of subsurface geology
Lectures 23-26	Presentation of subsurface results (maps and sections)
Lectures 27-28	Formation evaluation
Part –3	**Ores Microscopy** (An hour/week)
Lectures 1-9	Mineral parageneses
Lectures 10,14	Fluid inclusions in ore minerals
Lectures 15-20	Ore textures
Lectures 21-28	Trace elements, rare earth elements and isotopes in ores.
Weeks 29, 30	**Assessment**

Practical (3hrs/week) devoted only to Hydrogeology and Subsurface Geology

4. Teaching and Learning Methods

- Lectures
- Practical work
- Discussions
- Term paper and reports
- Web searching
- Assignments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 16^{th} Week	67.47%
Practical Examination	P	2 Hour Examination	The 15^{th} Week	32.53%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

- Ore microscopy and ore petrology (Craig & Vaughan, 1981) [For Ore Microscopy course].
- Applied Hydrogeology (2000) 4^{th} Ed. C.W.Fetter [For Hydrogeology course].
- Groundwater Hydrogeology (2004) 2^{nd} Ed. D.K. Tood and Larry W. Mays [For Hydrogeology course].
- Levorson, A. I, 1967. Geology of petroleum. San Francisco: W.H. Freeman. W. C. [For Subsurface Geology course].

Recommended Books:

- Ore genesis (Asoke Mookherjee, 1999) [For Ore Microscopy course].
- Geochemistry, Groundwater and Pollution (2005) 2^{nd} Ed. Appelo & Postma [For Hydrogeology course].
- Boggs,s. Jr., 1995, Principles of sedimentology and stratigraphy, 2^{nd} ed: Engle Wood Cliffs, New Jersey [For Subsurface geology course].

Journals and website

- Journal of Economic Geology
- Mineralium Deposita
- Journal of Geophysical Research
- Hydrogeology Journal

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.

- TDS meter, E.C. meter, PH meter, water level meter, Flame photometer, Spectrophotometer, subsurface logs.

- Software package.

	Course Coordinator	Head of Department
Name	Prof. Ibrahim A. Salem	Prof. Abdel Fatah Zalat
Name (Arabic)	أ. د. إبراهيم عبد الناجي سالم	أ. د. عبد الفتاح زلط
Signature	……………………………..	…………………………………
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	ILOs											
	Knowledge and Understanding			Intellectual			Practical		Transferable			
	A1	A2	A3	B1	B2	B3	C1	C2	D1	D2	D3	D4
Part – 1 Hydrogeology												
Hydrologic cycle and hydrologic budget	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Run off and stream flow	☒	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒
Acquifer characteristics	☒	☐	☐	☒	☐	☐	☒	☐	☒	☒	☒	☒
Principles of groundwater	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Water wells	☒	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒
Water chemistry and water quality	☒	☐	☐	☒	☐	☐	☒	☐	☒	☒	☒	☒
Groundwater pollution, contaminate transport	☒	☐	☐	☒	☐	☐	☐	☐	☒	☒	☒	☒
Investigation of groundwater	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐
Groundwater modeling	☒	☐	☐	☒	☐	☐	☒	☐	☒	☒	☒	☒
Hydrogeology of Egypt	☒	☐	☐	☒	☐	☐	☐	☐	☒	☒	☒	☒
Part-2 Subsurface Geology												
Introduction	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Information needed for subsurface work	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Source of information for subsurface work	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Correlation	☐	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒	☒
Facies	☐	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒	☒
Depositional environments	☐	☒	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒
Basin analysis	☐	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒	☒
Application of subsurface geology	☐	☒	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐
Presentation of subsurface results (maps	☐	☒	☐	☐	☒	☐	☐	☒	☐	☐	☐	☐

Courses	ILOs											
	Knowledge and Understanding			Intellectual			Practical		Transferable			
	A1	A2	A3	B1	B2	B3	C1	C2	D1	D2	D3	D4
and sections)												
Formation evaluation	☐	☒	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒
Part – 3 Ore Microscopy												
Mineral parageneses	☐	☐	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒
Fluid inclusions in ore minerals	☐	☐	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒
Ore textures	☐	☐	☒	☐	☐	☒	☐	☐	☐	☐	☐	☐
Trace elements, rare earth elements and isotopes in ores.	☐	☐	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒

Learning and Teaching methods – Course ILOs Matrix

Learning and Teaching methods	Course outcomes ILOs											
	Knowledge and Understanding			Intellectual			Practical		Transferable			
	A1	A2	A3	B1	B2	B3	C1	C2	D1	D2	D3	D4
Lectures	☒	☒	☒	☐	☐	☐	☐	☐	☒	☐	☐	☒
Practical work	☐	☐	☐	☐	☐	☐	☒	☒	☐	☒	☒	☒
Discussions	☐	☐	☐	☒	☒	☒	☐	☐	☐	☐	☐	☒
Term paper and reports	☒	☒	☒	☐	☐	☐	☐	☐	☒	☒	☒	☒
Web searching	☒	☒	☒	☐	☐	☐	☐	☐	☐	☒	☒	☒
Assignments	☐	☐	☐	☒	☒	☒	☒	☒	☒	☒	☒	☐

Assessment methods – Course ILOs Matrix

Assessment methods	Course outcomes ILOs											
	Knowledge and Understanding			Intellectual			Practical		Transferable			
	A1	A2	A3	B1	B2	B3	C1	C2	D1	D2	D3	D4
Written examination	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
Practical examination	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐

Course Title	**Geology of Ore Deposits**	
	Ore Exploration	
	Mining Geology	
Course Code	**2032**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Ibrahim A. Salem**	
Other Staff	**Prof. Hassan Z. Harraz**	
	Dr. Mohamed M. Hamdy	
Level	**Diploma Degree**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. Geology**	
Course Delivery	**Lecture**	**28 x 4h**
	Practical	**28 x 3h**
Parent Department	**Geology**	
Date of Approval	**September, 2014**	

1. Aims

This course is in three parts. The first part aims to provide students with detailed knowledge and understanding of the genesis and distribution of mineral deposits. **The second part aims to** in-depth coverage of exploration programmes of mineral deposits. **The third part aims to** enable students to enable students to acquire In-depth knowledge and understanding of the mining methods, mine workings, ore extraction and processing, mine waste disposal, and mining law.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this course students should acquire thorough knowledge and understanding of:

A1. Genesis and distribution of igneous, metamorphic and sedimentary mineral deposits.

A2. Terminology and classification of geochemical haloes, methods of mineral deposits exploration.

A3. Mining methods, tools and workings, ore reserve classification, extraction and processing methods and mining law.

B. Intellectual skills:

They will also acquire the ability to:

B1. Deduce genetic models and conditions of formation of ore deposits.

B2. Visualize and analyze exploration data and depict the anomaly locations of ore deposits.

B3. Propose the mining methods and plan.

B4. Critically evaluate the published literature devoted to the geology of ore deposits, ore exploration and mining geology.

C. Professional and practical skills: (devoted only to part I)

Students will be able to:

C1. Define the mineralogical composition and classify the ore deposit.

C2. Calculate the temperature and pressure of formation of ore deposits considering scientific ethics

D. General and transferable skills:

D1. Write reports and give oral representation.

D2. Use PC packages to write, plot and present information with confidence and accuracy

D3. Find effective solution for problem involving complex information.

D4. Work independently and in a team.

3. Contents

Part –1	**Geology of Ore deposits** (An hour/week)
Lectures 1-6	Magmatic deposits
Lectures 7-12	Sedimentary deposits
Lectures 13,14	Evaporite deposits
Lectures 15-18	Stratiform sulphide of volcanic origin
Lectures 19,22	Placer deposits
Lectures 23,28	Mineral deposits in Egypt
Part- 2	**Ore exploration** (An hour/week)
Lectures 1-3	Overview of exploration geology, exploration geochemistry
Lectures 4-6	Exploration geology terminology: anomalies, background, noise, exploration geochemistry sequence
Lectures 7-9	Dispersion halos: primary dispersion halos, secondary dispersion halos mechanical
Lectures 10-12	Geochemical sampling: rock, soil, stream-sediment, water and vegetation and vapour sampling
Lectures 13-15	Geochemical survey: stream sediment and soil sampling surveys
Lectures 16-18	Field and laboratory analytical methods: field tests, field notes in exploration geochemistry, laboratory methods
Lectures 19-22	Treatment of geochemical data: geochemical maps, geostatistics (Threshold value, anomalous values, background values)

Lectures 23-28	Interpretation of geochemical data: statistical interpretation, univariate analysis, multivariate analysis
Part –3	**Mining Geology** (Two hours/week)
Lectures 1-4	Mining methods: open-pit, pit-slopes, underground, bulk UG, mining cycle.
Lectures 5-8	Mine workings, drill holes and method of support of underground workings.
Lectures 9-12	Method of extractions
Lectures 13	Rock pressure.
Lectures 14	Explosives.
Lectures 15	Mine lighting and mine drainage.
Lectures 16	Mine waste disposal, wastes, incidents, engineered waste
Lectures 17-21	Grade and tonnage calculations
Lectures 22-23	Ore reserve classifications
Lectures 24-26	Mining and money, contracts, prices, valuation, reserves, costing, related issues
Lectures 27-28	Future of mining, economics, automation, bacteria….etc,

4. Teaching and Learning Methods

- Lectures
- Practical work
- Discussions
- Term paper and reports
- Web searching
- Assignments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 16th Week	76.32%
Practical Examination	P	2 Hour Examination	The 15th Week	23.68 %

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

- Edwards, R.P. and Atkinson, K. 1986. Ore deposit geology and its influence on mineral exploration, Chapman & Hall, New York. [For Geology of ore deposits course].
- Marjoribanks, R. W. 1997. Geological methods in mineral exploration and mining, Chapman & Hall, London [For Ore exploration course].
- Peters, W.C. 1987. Exploration and mining geology. 2nd ed., John Wiely & Sons, Inc, 706p [For Mining Geology course].

Recommended Books:

- Chugh, C.P. 1992. High technology in drilling and exploration, Oxford & IBH, New Delhi [For Mining Geology course].
- Ore genesis, 1999, Asoke Mookherjee. [For Geology of ore deposits course].
- Kuzvart, M. and Bohmer, M. 1986. Prospecting and exploration of mineral deposits, Elsevier, Amsterdam [For Ore Exploration course].

Journals and website

- *Bulletin of Canadian Institute of Mining and Metallurgy*
- *Transactions of the Institution of Mining and Metallurgy (London)*
- *Mineralium Deposita*
- *Economic Geology*
- *Journal of Geochemical Exploration*
- http://www.minerals.usgs.gov/minerals/index.html/
- http://www.centamin.com/investor_info.php
- http://www.serc.carleton.edu/research_education/nativelands/pineridge/exploartionanddevelopment.html;

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.

- Clean geochemical lab including digestion unit, ICP-MS, XRF.

- EPMA, IPMA

- Software package

	Course Coordinator	Head of Department
Name	Prof. Ibrahim A. Salem	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د. إبراهيم عبد الناجي سالم	أ. د.عبدالفتاح على زلط
Signature	……………………………	……………………………….
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Course Contents	Knowledge and Understanding			Intellectual				Practical		Transferable			
	A1	A2	A3	B1	B2	B3	B4	C1	C2	D1	D2	D3	D4
Part - 1 Geology of ore deposits													
Magmatic deposits	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒	☒	☒	☒
Sedimentary deposits	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒	☒	☒	☒
Evaporite deposits	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒	☒	☒	☒
Stratiform sulphide of volcanic origin	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒	☒	☒	☒
Placer deposits	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒	☒	☒	☒
Mineral deposits in Egypt	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒	☒	☒	☒
Part-2 Ore exploration													
Overview of exploration geology, exploration geochemistry	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Exploration geology terminology: anomalies,	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Dispersion halos: primary dispersion halos	☐	☒	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐
Geochemical sampling: rock, soil, stream-sediment	☐	☒	☐	☐	☐	☐	☒	☐	☐	☒	☒	☐	☐
Geochemical survey: stream sediment	☐	☒	☐	☐	☐	☐	☒	☐	☐	☒	☒	☒	☒
Field and laboratory analytical methods	☐	☒	☐	☐	☒	☐	☐	☐	☐	☐	☒	☐	☒
Treatment of geochemical data	☐	☒	☐	☐	☒	☐	☒	☐	☐	☐	☐	☒	☒

Course Contents	**Knowledge and Understanding**			**Intellectual**				**Practical**		**Transferable**			
	A1	**A2**	**A3**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**D1**	**D2**	**D3**	**D4**
Interpretation of geochemical data: statistical interpretation	☐	☒	☐	☐	☒	☐	☒	☐	☐	☐	☐	☒	☒
Part –3 Mining Geology													
Mining methods: open-pit, pit-slopes	☐	☐	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐
Mine workings, drill holes	☐	☐	☒	☒	☐	☒	☒	☐	☐	☒	☒	☐	☐
Method of extractions	☐	☐	☒	☒	☐	☒	☒	☐	☐	☒	☒	☒	☒
Rock pressure.	☐	☐	☒	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐
explosives	☐	☐	☒	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐
Mine lighting and mine drainage.	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Mine waste disposal, wastes,	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Grade and tonnage calculations	☐	☐	☒	☒	☐	☐	☒	☐	☐	☐	☐	☒	☒
Ore reserve classification	☐	☐	☒	☐	☐	☐	☒	☐	☐	☒	☒	☐	☐
Mining and money,	☐	☐	☒	☐	☐	☐	☒	☐	☐	☒	☒	☐	☐
Future of mining, economics,	☐	☐	☒	☒	☐	☐	☒	☐	☐	☒	☒	☐	☐

Teaching Methods – Course ILOs Matrix

Teaching Methods	Knowledge and Understanding			Intellectual				Practical		Transferable			
	A1	A2	A3	B1	B2	B3	B4	C1	C2	D1	D2	D3	D4
Lectures	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Practical work	☐	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☒	☒
Discussions	☐	☐	☐	☒	☒	☒	☒	☐	☐	☐	☐	☒	☒
Term paper and reports	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒	☒	☒
Web searching	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒
Assignments	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒	☒	☒

Assessment Methods – Course ILOs Matrix

Assessment Methods	Knowledge and Understanding			Intellectual				Practical		Transferable			
	A1	A2	A3	B1	B2	B3	B4	C1	C2	D1	D2	D3	D4
Written examination	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
Practical examination	☐	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐

Course Title	**Structural Geology, Economic Minerals, Photogeology, Nuclear Geology**	
Course Code	**2033**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Samir M. Aly**	
Other Staff	**Prof. Mahmoud H. Ashmawy**	
	Prof. Mohamed Atef Noweir	
	Prof. Mohamed A. Hamdy	
Level	**Diploma Degree**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. Geology**	
Course Delivery	**Lecture**	**28 x 4h**
	Practical	**28 x 3h**
Parent Department	**Geology**	
Date of Approval	**September, 2014**	

1. Aims

This course is in four parts. The first part aims to offer students with thorough knowledge and understanding of the geometries, kinematics and mechanics of thrust systems, and utility of the balanced-cross-sections in petroleum industry. **The second part aims to** give students detailed knowledge and understanding of divisions of economic minerals and harmful elements. **The third part aims to** provide students deep knowledge and understanding of the interpreting and processing of aerial photographs and Landsat images. **The fourth part aims to** provide students with deep knowledge and understanding of the radioactivity of minerals and rocks and how geologic ages are estimated using radioactive isotopes.

2. Intended Learning outcomes

A. Knowledge and understanding:

Upon successful completion of this course the students acquire thorough knowledge and understanding of:

A1. Thrust systems, major mechanism of folding, principals of balancing techniques and structural styles in petroleum provinces.

A2. Classification, mineralogy, chemistry and uses of economic minerals (Non-metallic and metallic).

A3. Visual interpretation and interpretation of photographs for landforms, lithology and structure mapping.

A4. Principals of radioactivity, radioactive analysis and radioactive isotope methods of K-Ar, Rb-Sr, U-Pb, Sm-Nd and C^{14}.

B. Intellectual skills:

They will also acquire the ability to:

B1. Interpret balanced cross-sections used in the petroleum industry.

B2. Discuss the chemical and mineralogical data of economic minerals (Non-metallic and metallic) and predict the harmful elements.

B3. Analyze aerial photographs to interpret lithology, geological structures and landform systems.

B4. Evaluate and analyze the distribution of radioactivity in rocks and minerals.

C. Professional and practical skills:

Students will be able to:

C1. Construct and use the balanced cross-sections.

C~~2~~. Detect the mineralogical and chemical compositions of economic minerals (Non-metallic and metallic.

C3. Report lithology and structures and draw photogeologic map.

D. General and transferable skills:

D1. Write reports and give oral representation.

D2. Use PC packages to write, plot and present information.

D3. Find effective solution for problem involving complex information.

D4. Work independently and in a team.

3. Contents

Part - 1	**Structural Geology** (An hour/week)
Lectures 1-3	Introduction and Fundamental concepts
Lectures 4-8	Thrust geometries
Lectures 9-12	Thrust system
Lectures 13-16	Major mechanisms of folding
Lectures 17-22	Balanced cross-sections
Lectures 23-28	Structural styles in Petroleum Provinces
Part - 2	**Economic Minerals** (An hour/week)
Lectures 1-4	Classification of economic minerals
Lectures 5-14	Metallic minerals (mineralogy, chemistry and uses)

Lecture 15-28	Non-metallic minerals (mineralogy, chemistry and uses)
Part - 3	**Photogeology** (An hour/week)
Lectures 1-2	Fundamental of visual interpretation
Lectures 3-6	Approach of visual interpretation
Lectures 7-10	Equipment of visual interpretation
Lectures 11-14	Recognition of landforms (construction and destruction)
Lectures 15-18	Recognition of rock types (sedimentary, igneous and metamorphic)
Lectures 19-24	Recognition of structural features
Lectures 25-28	Writing photogeologic report
Part - 4	**Nuclear Geology** (An hour/week)
Lectures 1-6	Radioactivity and analysis
Lectures 7-10	K-Ar method
Lectures 11-14	Rb-Sr method
Lectures 15-18	U-Pb method
Lectures 19-24	Sm-Nd method
Lectures 25-28	C^{14} method

4. Teaching and Learning Methods

- Lectures
- Practical work
- Computer modeling
- Discussions
- Term paper and reports
- Web searching
- Assignments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 30th Week	(67.46%)
Practical Examination	P	2 Hour Examination	The 29th Week	(32.53%)

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

- Faure, G., 2004. Isotopes: Principles and applications [For Nuclear Geology course].
- Dorckin, I. V., Bogacheva, E. N., Druzhinin, A., Sobolevsky, I., Gorbunov, 1969. Economic mineral deposits. Higher School Public House, Moscow [For Economic Minerals course].
- Sabins, F.F., 1997. Remote Sensing: Principles and interpretation (3^{rd}), W.H.Freeman and Company, 494 p. [For Photogeology course].
- Woodward, N.B., Boyer, S.E. and Suppe, J., 1985. An outline of balanced cross-sections. Univ. of Tennessee, Dept. of Geol. Sci, v. 11, 166 p. [For Structural geology course]

Recommended Books:

- Claude J., Allegre 2008. Isotope Geology [For Nuclear Geology course].
- Manning, D.A. 1995 Introduction to industrial minerals. Chapman & Hall, 276p. [For Economic Minerals course].
- Linesand, T.H. and Kiefer, R.W. (2000): Remote sensing and image interpretation (4^{th}). John Wiely & Sons. Inc., 724p. [For Photogeology course].
- McClay, K.R., 1992. Thrust Tectonics. Chapman & Hall. 447 p. [For Structural geology course]
- Lowell, J.D., 1985. Structural Styles in Petroleum Exploration. OGCI Publications. 477 p. [For Structural geology course]

Journals and website

- Industrial Geology
- Chemical Geology
- Mineralium Deposita
- International Journal of Remote Sensing
- Journal of Structural geology
- http://rsd.gsfc.nasa.gov/

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.

- Software package

	Course Coordinator	Head of Department
Name	Prof. Samir M. Aly	Prof. Abdel Fattaf A.Zalat
Name (Arabic)	أ. د. سمير محمد علي	أ. د. عبد الفتاح على زلط
Signature	…………………………………..	…………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Contents	Knowledge and Understanding				Intellectual				Practical			Transferable			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
Part-1 Structural Geology															
Introduction	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Thrust geometries	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒
Thrust system	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒
Major mechanisms of folding	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒
Balanced cross-sections	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☒	☒	☒	☒
Structural styles in Petroleum Provinces	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☒	☒	☒	☒
Part-2 Economic Minerals															
Classification of economic minerals	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒
Metallic minerals	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	☒	☒	☒
Non-metallic minerals	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒	☒	☒	☒
Part-3 Photogeology															
Fundamental of visual interpretation	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Approach of visual interpretation	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Equipments of visual interpretation	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Recognition of landforms	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒	☒
Recognition of rock types	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒	☒
Recognition of structural features	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒	☒
Writing photogeologic report	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒	☒
Part-4 Nuclear Geology															
Radioactivity and analysis	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒
K-Ar method	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒
Rb-Sr method	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒

U-Pb method	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒
Sm-Nd method	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒
C^{14} method	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒

Learning Methods – Course ILOs Matrix

Learning Methods	Knowledge and Understanding				Intellectual				Practical			Transferable			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
Lectures	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Practical work	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☐	☒	☒	☒
Computer modeling	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☒
Discussions	☐	☐	☐	☐	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
Term paper and reports	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
Web searching	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒
Assignments	☐	☐	☐	☐	☒	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒

Assessment Methods – Course ILOs Matrix

Learning Methods	Knowledge and Understanding				Intellectual				Practical			Transferable			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
Written exam	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐
Practical exam	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☐	☐	☐	☐

Course Title	Computer	
Course Code	2034	
Academic Year	2013/2014	
Coordinator	Prof. Mohamed El-Awady	
Other Staff	Prof. Mahmoud Kamel, Prof. Qadry Zakaria	
Semester	Taught over 2 semesters	
Pre-Requisite	B.Sc.	
Course Delivery	Lecture	28 x 1h lectures
	Practical	28 x 1h practical
Parent Department	Computer Centre	
Date of Approval	September, 2014	

1. Aims

This course will enable students to acquire a range of transferable skills that are important for post graduate M. Sc. students to:

1) Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.
2) Underpin academic work throughout postgraduate studies.
3) Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

a. the use of IT in the context of their postgraduate studies.
b. the diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.
c. necessary graphical, statistical and frequency analyses of different types of data.
d. powerful presentation using sophisticated software packages.
e. internet resources.
f. Solution of scientific problems using computer programming.
g. different photo enhancing and manipulation techniques.

B. Intellectual skills:

They should also acquire the ability to:

B1. Integrate different application programs to develop effective information analysis and presentation.

C. Professional and practical skills:

C1. Use a number of computer packages to present information.

D. General and transferable skills:

D1. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Lectures 1-2	Methods for graphical representations, Data analysis and Data modeling **Assignment 1** : **Using Application programs** Calculation of Slope and intersection of lines , Best fitting for data, Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)
Lectures 3-5	Statistical Data analysis **Assignment 2** : **Using Application programs** Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data
Lecture 6-7	Creating powerful presentation including charts, images, video, etc and different attractive animations **Assignment 3** : **Using PowerPoint program** Design a real and powerful presentation with different acquired skills
Lecture 8-9	Use of internet capabilities and searching engines **Assignment 4: Using the Internet** Life search on the internet for some real information
Lecture 10-11	Creating Data Base and related Queries and Reports **Assignment 5: Using Application programs** Creating a real Data Base and apply different queries and reports to extract useful information
Lecture 12-13	Computer programming language **Assignment 6**: Programming using Visual Basic 6 Solving real problems using a computer language
Lecture 14-15	Photo manipulation and enhancement using the Photoshop **Assignment 7**: **Using the Photoshop program** Practicing on manipulation and enhancing of images
Lectures 16	Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Assignments

The course is delivered through lectures, practical sessions and assignments. Team working skills are developed on a week-long laboratory exercises and the students present and defend their findings in a public seminar.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

	Course Coordinator	Head of Department
Name	Prof. Mohamed M. El-Awady	Prof. El-Said Taha Rizk
Name (Arabic)	أ.د. محمد العوضي	أ.د. السيد طه رزق
Signature	………………………..	………………………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Contents	Knowledge and Understanding							Practical	Transferable	
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Methods for graphical representations	☒	☒	☐	☐				☒	☒	☐
Statistical Data analysis	☒	☒	☐	☐				☒	☒	☐
Creating powerful presentation	☒	☒	☒	☒				☒	☒	☐
Use of internet capabilities and searching engines	☒	☒	☐	☒	☒			☒	☒	☐
Creating Data Base	☒	☒	☒	☐				☒	☒	☒
Computer programming language	☒	☒	☒	☐		☒		☒	☒	☒
Photo manipulation using the photoshop	☒	☒	☐	☒			☒	☐	☒	☒
Introduction to Data frequency analysis using Fourier analysis	☒	☒	☐	☒		☒		☐	☒	☒

Course Title	Statistics	
Course Code	**1618**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Mohamed E. Abd El Monsef**	
Other staff		
Level	**Diploma Degree**	
Semester	**Semesters**	
Pre-Requisite	**B. Sc. Geology**	
Course delivery	**Lecture**	**28 x 1h lectures**
	Practical	**-**
Parent Department	**Mathematics Department**	
Date of approval	**September, 2014**	

1. Aims

This module aims to provide M. Sc. students in biology with basic concepts of study design and data analysis suitable for laboratory and field research, and to help students to develop the skills needed to apply statistical methods using related statistical software; e.g. Primer or GraphPad in scientific biological research. Emphasis will be on practical and applied skills using example of relevance to biology students.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

- A1. Statistical issues such as statistical measures for data description; statistical estimation; correlations and testing hypothesis.
- A2. Study design.
- A3. Types of variables that are used in geological research.
- A4. Sampling variation, how to quantify the variability and its role in comparing groups or categories.

***B. Intellectual skills**:*

- B1. Carry out confidently simple essential statistical methods in geological research and to interpret results.
- B2. Select appropriate statistical methods for analysis of simple data sets and apply them on a computer using geo-statistical software, GraphPad.
- B3. Summaries data using graphical and tabular data.
- B4. Interpret research findings and explain them in a clear, concise and logical manner.

C. Professional and practical skills

- C1. Select and apply appropriate basic statistical methods for analysis of data.
- C2. Use GraphPad package in data analysis.

C3. Tackle skills in handling data on a computer and otherwise, and deriving and presenting quantitative results using appropriate tables, figures, and summaries.

D. Transferable skills

D1. Write report including graphical material.
D2. Present and discuss the finding from statistical analysis in a clear, concise and logical manner.
D3. Use internet and other electronic sources as a source of information.

3. Contents

Analysis and design of research studies (two hours/week)

Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.
Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.
Lectures 27-28	Design of experiments: The null hypothesis, statistical significance and rejecting the null hypothesis.
Lectures 29-30	Revision
Weeks 31, 32	**Assessment**

4. Teaching and Learning Methods

- Lectures are an integral part of course delivery in this course, supported by problems classes, tutorial groups, computational work, office hours, and individual tutorials.

- Students engage in private study in which they work through set problem sheets and individual assignments as well as assimilating lecture content.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 16th Week	90%
Oral Assessment	KU, I	Assessment Session	Term Final	5%
Semester work	KU, I	Continuous Assessment		5%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential books

- Glantz, Stanton A. (2005): Primer of Biostatistics, 6th Edition McGraw-Hill.

Recommended books

- Samuels, M. L. (1989): Statistics for the Life Sciences. Dellen Publishing Company, USA.
- Rosner, B. (1990): Fundamentals of Biostatistics. PWS-Kent Publishing Company, USA.

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computers Presentations and Writing Boards
- Primer or GraphPad biostatistics software.

	Course Coordinator	Head of Department
Name	Prof. Abd-Elmoneim A. Mohamed	Prof. Kadry Zakaria Elsherbeny
Name (Arabic)	أ. د. محمد عزت عبد المنصف	قدرى زكريا الشربينى أ. د.
Signature		
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	Course outcomes ILOs													
	Knowledge and Understanding				Intellectual				Practical			Transferable		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3
Introduction	☒	☒	☒		☒	☒	☒	☐ ☒	☐	☐	☒	☒	☒	☐
Summarizing data	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐	☒	☐	☐
Sampling variability of a mean	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐	☒	☐	☐
Analysis of quantitative data	☒	☐	☐	☐	☒	☒	☒	☒	☐	☒	☒	☒	☐	☐
ANOVA	☒	☐	☐	☐	☒	☒	☐	☒	☐	☒	☒	☒	☒	☐
Sampling variability of proportions	☒	☒	☒	☒	☐	☒	☒	☒	☐	☒	☒	☒	☒	☐
Analysis of categorical data	☒	☒	☒	☒	☐	☒	☒	☒	☐	☒	☒	☒	☒	☐
Regression and correlation	☒	☒	☒	☒	☐	☐	☒	☒	☐	☒	☒	☐	☒	☒
Comparing correlations and regression	☒	☒	☒	☐	☐	☐	☒	☒	☐	☒	☒	☐	☒	☒
Regression and correlation	☒	☒	☒	☐	☐	☐	☒	☒	☐	☒	☒	☐	☒	☒
Comparing distribution	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒
Comparing means: Computer applications	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒	☐	☐	☒	☐
Comparing variances: Computer applications	☒	☒	☒	☐	☐	☐	☐	☐	☐	☒	☒	☐	☒	☒
Design of experiments	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☒	☐	☒	☒

Diploma Program
of
Geophysics

A. Programme Specification

Programme Title	**Diploma of Geophysics**
Award	**Diploma of Geophysics**
Parent Department	**Geology Department**
Teaching Institution	**Faculty of Science - TU**
Awarding Institution	**Tanta University**
Coordinator	**Prof. Nader H. El-Gindy**
External Evaluator(s)	**Prof. Salah N. Ayad, Professor of Geology, Faculty of Science, Mansura University.**
QAA Benchmarking Standards	**Academic Reference Standards (ARS)**
Other Reference Points	
Date of delivery	**Every year in September**
Review Date	**Internal Periodic Review, Summer 2014**
Date of Approval	**September, 2014**

1. Aims

- To provide a sound theoretical background in application of geophysics to the exploration of oil, groundwater and ore deposits.
- Learn how to acquire process and interpret different types of geophysical measurements.
- To enable the gaining of a broad range of transferable skills.
- To equip graduates with the skills to enter employment in a wide range of contexts.
- To motivate in graduates the culture of lifelong learning and continuing professional development and an appreciation of the value of science to society.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. Basics of the different geophysical methods and the techniques used in different settings of geophysical surveying.

A2. Formation and occurrence of petroleum and groundwater reservoirs, and ore deposits.

A3. Potential factors affecting different geophysical measurements, and their implications in terms of mathematical computations of different geometrical structures and their expressions.

B. Intellectual skills:

They will also acquire the ability to:

B1. Formulate a hypothesis, plan and execute laboratory investigation or development work, evaluate the outcomes and draw valid conclusions.

B2. Apply subject knowledge and understanding to address familiar and unfamiliar problems related to geophysical explorations.

B3. Analyse, synthesise and assimilate diverse information in a critical manner.

B4. Construct reasoned arguments to support a position on the ethical and social impact of scientific advances and appreciate the existence of different points of view.

B5. Integrate theory and practice.

C. Professional and practical skills:

C4. Record, collect, analyse and report data of laboratory and field geophysical investigations.

C5. Undertake laboratory and field investigations in a liable, safe and ethical manner.

C6. Plan and conduct various forms of laboratory and field investigations in specific, precise and accurate manner.

D. General and transferable skills:

D5. Communicate about a subject clearly, confidently and effectively using a range of presentational techniques.

D6. Apply numerical and IT skills with confidence and accuracy.

D7. Work both independently and in collaboration with others.

D8. Take responsibility for self-managed learning and personal/professional development.

3. Academic standards

3.A External references for standards (Benchmarks):

~~National~~ Academic Reference Standards (ARS)

3.B Comparison of provision to external references:

~~International~~ Academic Reference Standards(ARS).

Academic Reference Standards:

The academic reference standards of the program of Diploma of Geophysics are based upon the General Academic Reference Standards (ARS) published by the National Authority of Quality Assurance and Accreditation of Education (NAQAAE, 2009) for graduate studies of basics science. The following Specific Academic Reference Standards of the program of Diploma of Geophysics were adopted by the Department of Geology, Faculty of Science, Tanta University and were approved by the Faculty Council in 20/11/2012

Specific Academic Reference Standards

3.1 Graduate Attributes

The graduates must be able to:

1.1. Develop scientific approaches that meet community needs of the geophyiscal sciences.

1.2. Utilize scientific facts and theories to analyze and interpret practical geophysical data.

1.3. Collect and analyze data using appropriate formats and techniques.

1.4. Postulate concepts and choose appropriate solutions to solve applied geophysical problems on scientific basis.

1.5. Apply effectively information technology relevant to the geophysics.

1.6. Participate effectively in a multidisciplinary teamwork and be flexible for adaptation, decision making and working under contradictory conditions as well as exhibiting the sense of beauty and neatness.

1.7. Estimate, consult and assess the visibility of the applied geophysics projects.

1.8. Adopt self and long life-learning and participate effectively in research activities.

1.9. Preparing project and lab-job training.

1.10. Design and undertake geophysical problems (using maps, logs, field instruments) and assess their results.

3.2. Knowledge and Understanding

Graduates must acquire knowledge and understanding of:

2.1. The related scientific facts, concepts, and techniques of geophysics.

2.2. The terminology, nomenclature and classification systems of geophysics.

2.3. The methods applied for interpreting and analyzing geophysical data

2.4. The developmental progress of the program-related knowledge.

2.5. The relation between geophysics and community.

3.3. Intellectual Skills

The graduates must be able to:

3.1. Analyze, synthesize, assess and interpret qualitatively and quantitatively applied geophysics data.

3.2. Develop lines of argument and appropriate judgments in accordance with scientific theories and concepts about the geophysics.

3.3. Construct several related and integrated information to confirm, make evidence and test hypotheses of geophysics.

3.4. Construct modeling of geophysical phenomenas, and evaluate the implications of sustainability and sustainable development.

3.5. Analyze and interpret quantitative data in maps, graphs, figures, tables and other sources of information

3.4. Practical and Professional Skills

The graduates must be able to:

4.1. Plan, design, process and report on the geophysical data, using appropriate techniques and considering scientific guidance.

4.2. Apply techniques and tools considering scientific ethics.

4.3. Solve problems using a range of formats and advanced approaches.

4.4. Identify and criticize the different methods used in addressing subject related issues.

4.5. Preparing project and lab-job training.

3.5. General and Transferable Skills

The graduates must be able to:

5.1. Use information and communication technology effectively.

5.2. Identify roles and responsibilities, and their performing manner.

5.3. Think independently, set tasks and solve problems on scientific basis.

5.4. Work in groups effectively; manage time, collaborate and communicate with others positively.

5.5. Consider community linked problems, ethics and traditions.

5.6. Apply scientific models, systems, and tools effectively.

5.7. preparing project and lab-job training.

4. Curriculum Structure and contents:

4.A	Programme duration		One Year					
4.B	Programme structure							
4.B.1	Number of contact hours		per Week:					
		First term:	Lectures	13	Lab.	10	Total	18

		Second term:	Lectures	13	Lab.	10	Total	18
	Overall	Contact hours	Lectures	26	Lab.	20	Total	36
4.B.2	Number of contact hours		Compulsory	26	Optional	None	Optional	None
4.B.3	Number of credit hours of specialized courses				No.	33	%	92
4.B.4	Number of contact hours of courses of social							
	sciences and humanities:				No.	-	%	-
4.B.5	Number of credit hours of other courses:				No.	3	%	8

5. Programme courses

Year 1	Course Title	Lec.	Prac.	Exer.	Program ILOs Covered
Code	Student must do the following modules:	Hours			
2041	Gravity methods Electric methods	4	3		
2042	Magnetic methods Seismology	4	3		
2043	Field Geology and mathematics	4	3		
2044	Computer	1	1		
1618	Statistics	1			

6. Programme admission requirements

The applicants must have obtained a Bachelor's degree, or its equivalent, in Geology with a "good" degree as a minimum for approval.

7. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression:

- The programme includes one year of coursework, followed by a research project, i.e. the Master thesis, by laboratory investigation in a mentored environment.
- Assessment is held by the end of the first year, and student will be eligible only on attaining a "pass" degree (60%).
- The student who fails certain course at the first attempt will be eligible for only a "Pass" degree following only one re-set examination.
- The student can submit his thesis only after one year from the date of the Faculty Council approval on the thesis subject.

8. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Not applied yet	
2. Alumni	Not applied yet	
3. Stakeholders(Employers)	Not applied yet	
4. External Evaluator(s)(External Examiner(s))	Prof. Salah N. Ayad	

We certify that all of the information required to deliver this programme is contained in the above specification and will be implemented. All course specifications for this program are in place.

Programme Contents – Programme ILOs Matrix

Courses	Programme outcomes ILOs															
	Knowledge and Understanding				Intellectual					Practical			Transferable			
	A1	A2	A3		B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4
2041 Gravity methods Electric methods	☒	☒	☐		☐	☒	☐	☒	☐	☒	☒	☐	☒	☒	☐	☐
2042 Magnetic methods Seismology	☐	☒	☒		☐	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐
2043 Field Geology and mathematics	☐	☐	☐		☐	☒	☒	☒	☐	☒	☐	☒	☐	☒	☒	☒
2044 Computer	☐	☐	☒		☒	☐	☐	☐	☒	☐	☐	☒	☒	☒	☒	☒
1618 Statistics	☐	☐	☒		☒	☐	☐	☐	☒	☐	☐	☒	☐	☒	☒	☒

Name	Signature	Date
Programme Coordinator: Prof. Nader H. El-Gendy أ. د.نادر حسنى الجندى	……..……..………..…	/9/2014
Head of Quality Assurance Unit: Prof. Hoda K. El Sayied أ.د. هدى كمال السيد	……..……..………..…	/9/2014
Dean of the Faculty: Prof. Tarek Abd elmoniem Fayed أ.د. طارق عبد المنعم فايد	……..……..………..…	/9/2014

Course Title	**Gravity Methods and Electric Methods**	
Course Code	**2041**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Nader H. El Gendy**	
Other Staff	**Prof. Mohamed R. Soliman**	
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc. in Geology or Geophysics**	
Course Delivery	**Lecture**	**28 x 2h lectures**
	Practical	**28 x 4h practical**
Parent Department	**Geology**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to:

1. Acquire knowledge of the main concepts of gravity and electric methods.

2. Carry out different ground surveys and measurements and deal with encountered problems

3. Conduct different types of corrections of raw gravity and electric data

4. Interpret corrected data qualitatively and quantitatively

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. Electric and gravitational potential fields.

A2. Different subsurface structures and water quality by analyzing different anomalies.

A3. Potential interpretation.

B. Intellectual skills:

They should also acquire the ability to:

B1. Solve the gravity problems throw designing models.

B2. Compute theoretical resistivity data and compare it with observed one.

B3. Apply the controlling subsurface parameters.

C. Professional and practical skills:

C1. Measure 2-D and 3-D subsurface structures using different models

C2. Draw the subsurface tectonics and basement surface maps.

C3. Deduce water quality through resistivity measurements.

D. General and transferable skills:

D1. Appropriate scientific communication.

D2. Work independently and within a team.

D3. Make good use of IT knowledge.

3. Contents

Lectures 1-4	Basics of gravity and electric methods
Lectures 5-7	Gravity and electric surveying
Lectures 8-10	Types and reduction of different potential corrections
Lectures 11-15	Data separation
Lectures 16-20	Analysis and modeling of gravity and electric data
Lectures 21-25	Interpretation methods
Lectures 21-28	Application of gravity and electric methods
Weeks 29, 30	**Assessment**
	Practical work (3hrs /week)

4. Teaching and Learning Methods

- Lectures
- Laboratory
- Web search assignments
- Writing reports

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable.

6. List of references

Essential Books:

- Introduction to geophysical prospecting (Dobrin, and Savit, 1988)

- Applied Geophysics (Telford, et al., 1990)

Recommended Books:

- Gravity and magnetic oil prospecting (Nettleton, 1976)

Periodicals, Web sites:

- J. Geophysical Research

- J. Geophysical J. International.

7. Facilities required for teaching and learning

- Computer

- Data show projector- Sophisticated licensed software

	Course Coordinator	Head of Department
Name	Prof. Nader Hosni El Gendy	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ.د. نادر حسنى الجندى	أ.د. عبدالفتاح على زلط
Signature	…………………………….	……………………………...
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	Programme outcomes ILOs															
	Knowledge and Understanding				Intellectual					Practical			Transferable			
	A1	A2	A3		B1	B2	B3			C1	C2	C3	D1	D2	D3	
Basics of gravity and electric methods	☒	☒	☐		☐	☒	☐			☒	☒	☐	☒	☒	☐	
Gravity and electric surveying	☐	☒	☒		☐	☒	☐			☒	☒	☐	☒	☒	☐	
Types and reduction of different potential corrections	☐	☐	☐		☐	☒	☐			☒	☐	☐	☐	☒	☐	
Data separation	☐	☒	☒		☐	☒	☒			☐	☒	☐	☐	☒	☐	
Analysis and modeling of gravity and electric data	☒	☐	☐		☒	☐	☐			☐	☐	☒	☐	☐	☒	
Interpretation methods	☐	☒	☒		☒	☒	☒			☐	☐	☒	☐	☒	☒	
Application of gravity and electric methods	☐	☒	☒		☒	☒	☒			☐	☐	☒	☐	☒	☒	

Learning and Teaching Methods-ILOs

Courses	Programme outcomes ILOs														
	Knowledge and Understanding					Intellectual				Practical			Transferable		
	A1	A2	A3			B1	B2	B3		C1	C2	C3	D1	D2	D3	
Lectures	X	X	X			X							X			
Laboratory						X				X	X	X		X		
Web search assignment							X						X	X		
Writing Reports			X				X	X							X	

Assessment Methods-ILOs

Courses	Programme outcomes ILOs															
	Knowledge and Understanding					Intellectual				Practical			Transferable			
	A1	A2	A3			B1	B2	B3		C1	C2	C3	D1	D2	D3	
Written Examination	X	X	X				X							X		
Practical Examination			X			X				X	X	X		X		
Semester work			X					X					X	X	X	

Course Title	**Magnetic Methods & Seismological Methods**	
Course Code	**2042**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Mohammed R. Soliman**	
Other Staff	**Dr. Shadia T. El-Khodary, Dr Motaz barakat**	
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc. in Geology or Geophysics**	
Course Delivery	**Lecture**	**28 x 2h lectures**
	Practical	**28 x 4h practical**
Parent Department	**Geology**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to:

A1. Acquire knowledge of basics and concepts of magnetism and seismology.
A2. Gain and analyze different types of data.
A3. learn how to interpret magnetic and seismological data in different geologic settings

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. Basics of magnetic and seismology methods

A2. Types of magnetic and seismological data sets.

A3. Meaning of earthquake seismology and earthquake classification parameters.

A4. Different magnetic and seismological data types

B. Intellectual skills:

They should also acquire the ability to:

B1. Visualize how earth's magnetic field initializes

B2. Calculate earthquake magnitude.

B3. Depict subsurface structures

B4. Anticipate seismic hazards

C. Professional and practical skills:

C1. Handle different types of magnetic and seismological data.

C2. Collect and analyze skillfully different data types.

C3. Analyze, locate and discriminate between different types of earthquakes

C4. Prepare professional reports on data handling and interpretation.

D. General and transferable skills:

D1. Conduct appropriate scientific communication.

D2. Work independently and within a team.

D3. Make good use of IT knowledge.

3. Contents

Lectures 1-2	Basics of magnetism and seismology
Lectures 3-4	Types of magnetism
Lectures 5-6	Magnetic data acquisition (field & lab)
Lectures 7-8	Magnetic data analysis
Lectures 9-10	Magnetic data interpretation
Lectures 11-12	Internal structure of earth
Lectures 13-14	Application of magnetic methods
Lectures 15-17	Types of seismic waves and seismic velocities
Lectures 18-19	Causes and classification of earthquakes
Lectures 20-21	Seismogram recording and its interpretation.
Lectures 22-23	Determination of earthquake parameters and its intensity
Lectures 24-25	Earthquake magnitude-frequency relation and fault-plane solution.
Lectures 26-28	Space distribution of earthquakes and the main belts
Weeks 29, 30	**Assessment**

Practical (3hrs/week)

4. Teaching and Learning Methods

- Lectures
- Laboratory
- Web search assignments
- Writing reports

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

- Butler, F. B.: Paleomagnetism, magnetic domains to geologic terrains. Blackwell Şci. Publ. 319p.
- Sharma, P.V., 1986: Geophysical methods in geology. Elsevier, Amsterdam, 442p.
- Nettleton, L. L., 1976: Gravity and magnetic in oil prospecting. Mc. Grow Hill Book Co. N. Y., 464p.

Recommended Books:

- Telford, 1992: Applied Geophysics.
- McElhinny & McFadden, 2000: Paleomagnetism, continents and oceans.
- Bath, M., (1979): Introduction to seismology, Birkauser

Periodicals, Web sites:

- J. Geophysical Research
- Geophysical J. International.
- Web sites: http://www.usgs.gov/

7. Facilities required for teaching and learning

- Computer
- Data show projector
- Sophisticated licensed software

	Course Coordinator	Head of Department
Name	Prof. **Mohammed R. Soliman**	**Prof. Abdelfattah Ali Zalat**
Name (Arabic)	**أ.د . محمد رفعت سليمان**	**أ.د. عبدالفتاح على زلط**
Signature		
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	Programme outcomes ILOs														
	Knowledge and Understanding				Intellectual				Practical				Transferable		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3
Basics of magnetism and seismology	☒	☒	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☒	☒	☐
Types of magnetism	☐	☒	☐	☐	☐	☐	☐	☒	☒	☒	☐	☐	☒	☒	☐
Magnetic data acquisition (field & lab)	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☒	☐
Magnetic data analysis	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☒	☒	☐
Magnetic data interpretation	☒	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒
Internal structure of earth	☒	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒
Application of magnetic methods	☒	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒
Types of seismic waves	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☒	☐	☒	☐	☒
Causes and classification of earthquakes	☐	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒	☒	☒	☒
Seismogram recording and its interpretation.	☐	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒	☒	☒	☒
Determination of earthquake parameters	☐	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒	☒	☒	☒
Earthquake magnitude-frequency relation	☐	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☐	☒	☒	☒
Space distribution of earthquakes	☐	☒	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒	☒	☒	☒

Learning and Teaching Methods-ILOs

Courses	Programme outcomes ILOs															
	Knowledge and Understanding					Intellectual				Practical				Transferable		
	A1	A2	A3	A4		B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3
Lectures	X	X	X	X		X			X					X		
Laboratory						X				X	X	X	X		X	
Web search assignments							X							X	X	
Writing Reports			X				X	X	X							X

Assessment Methods-ILOs

Courses	Programme outcomes ILOs																
	Knowledge and Understanding					Intellectual				Practical				Transferable			
	A1	A2	A3	A4		B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	
Written Examination	X	X	X	X			X								X		
Practical Examination			X			X				X	X	X	X		X		
Semester work			X	X				X	X					X	X	X	

Course Title	**Field Geology and Mathematics**	
Course Code	**2043**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Gaafar A. El-Baharyia**	
Other Staff	**Prof. Kadry Zakaria Elsherbeny**	
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc. in Geology or Geophysics**	
Course Delivery	**Lecture**	**28 x 4h lectures**
	Practical	**28 x 3h practicals**
Parent Department	**Geology**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to:

1. Demonstrate appropriate field skills for the students.
2. Interpret rock outcrops and other forms of surface and subsurface data with appropriate assessments of uncertainly.
3. Recognize high and low land geology and surface processes.
4. basic concepts of study design and data analysis suitable for laboratory and field research, and to help students to develop the skills needed to apply statistical methods using related statistical software; e.g. Primer or GraphPad in scientific geological research. Emphasis will be on practical and applied skills using example of relevance to geology students.

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. Relationships between surface geologic features.

A2. Discrimination between different rock outcrops and surface features.

A3. Geologic maps and field observations.

A4. Statistical issues such as statistical measures for data description.

B. Intellectual skills:

They should also acquire the ability to:

B1. Analyses field problems from all angles.

B2. Use all the subdiscplines in geology during learning and practice.

B3. Summaries data using graphical and tabular data.

C. Professional and practical skills:

C1. Handle the geologic maps and structures and cross-sections.

C2. Collect and analyze data and put them together in regional or local scale.

C3. Use GraphPad package in data analysis.

D. General and transferable skills:

D1. Appropriate scientific communication.

D2. Work independently and within a team.

D3. Make good use of IT knowledge.

3. Contents

Part-1	**Field Geology (two hours/week)**
Lecture 1	Introduction
Lectures 2-6	Field evidences and significances
Lecture 7-10	Recent orientations of mapped-geo-items
Lecture 11-14	Recent trends in sampling and field mapping
Lecture 15-19	A problematic point of field observations and their interpretation in the field
Lecture 20-21	Contact types and their field criteria
Lecture 22-23	Field measurements using recent techniques
Lecture 23-25	Surficial and subsurface mapping techniques
Lecture 26-28	How to write a short-term and/or extending geological report as well.
Part-2	**Mathematics (two hours/week)**

Practical (3hrs /week)

Analysis and design of research studies (two hours/week)

Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.
Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.
Lectures 27-28	Design of experiments: The null hypothesis, statistical significance and rejecting the null hypothesis.
Weeks 29, 30	**Assessment**

4. Teaching and Learning Methods

- Lectures
- Laboratory
- Writing reports

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

- Introduction to field geology, Bevier, M.L. (2005).

Recommended Books:

- Compton (1985) Geology in the field
- Barnes (1995) Basic geologic mapping

Periodicals, Web sites:

- J. Petrology
- J. Sedimentary Petrology

7. Facilities required for teaching and learning

- Computer, data show and software.
- Field geology instruments.

	Course Coordinator	Head of Department
Name	**Prof. Gaafar A. El-Baharyia**	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ.د. جعفر عبدالعليم البحريه	أ.د. عبد الفتاح على زلط
Signature	………………………………	…………………………………………
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	Programme outcomes ILOs												
	Knowledge and Understanding				Intellectual			Practical			Transferable		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	C3	D1	D2	D3
Introduction	☒	☒	☐	☐	☐	☒	☐	☒	☒	☐	☒	☒	☐
Field evidences and significances	☐	☒	☐	☐	☐	☒	☐	☒	☒	☐	☒	☒	☐
Recent orientations of mapped-geo-items	☐	☐	☒	☐	☐	☒	☐	☒	☐	☐	☐	☒	☐
Recent trends in sampling	☐	☒	☒	☐	☐	☒	☐	☐	☒	☐	☐	☒	☐
A problematic point of field observations	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒
Contact types	☐	☒	☒	☐	☒	☒	☐	☐	☒	☐	☐	☒	☒
Field measurement	☐	☒	☒	☐	☒	☒	☐	☐	☒	☐	☐	☒	☒
Surficial and subsurface mapping techniques	☐	☒	☒	☐	☒	☒	☐	☐	☒	☐	☐	☒	☒
How to write a short-term	☐	☒	☒	☐	☒	☒	☐	☐	☒	☐	☐	☒	☒

Mathematics													
Introduction	☐	☐	☐	☒	☐	☐	☒	☐	☐	☐	☒	☒	☒
Summarizing data	☐	☐	☐	☒	☐	☐	☒	☐	☐	☐	☐	☒	☐
Sampling variability of a mean	☐	☐	☐	☒	☐	☐	☒	☐	☐	☐	☐	☒	☐
Analysis of quantitative	☐	☐	☐	☒	☐	☐	☒	☐	☐	☒	☒	☒	☐
ANOVA	☐	☐	☐	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒
Sampling variability of proportions	☐	☐	☐	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒
Analysis of categorical data	☐	☐	☐	☒	☐	☐	☒	☐	☐	☒	☒	☒	☒
Regression	☐	☐	☐	☒	☐	☐	☒	☐	☐	☒	☒	☐	☐

and correlation													
Comparing correlations	☐	☐	☐	☒	☐	☐	☒	☐	☐	☒	☒	☐	☐
Regression and correlation	☐	☐	☐	☒	☐	☐	☒	☐	☐	☒	☒	☐	☐
Comparing distribution	☐	☐	☐	☒	☐	☐	☒	☐	☐	☒	☐	☐	☒
Comparing means	☐	☐	☐	☒	☐	☐	☒	☐	☐	☒	☐	☐	☒
Comparing variances	☐	☐	☐	☒	☐	☐	☒	☐	☐	☒	☒	☐	☐
Design of experiments	☐	☐	☐	☒	☐	☐	☒	☐	☐	☐	☒	☐	☐

Learning and Teaching Methods-ILOs

Courses	Programme outcomes ILOs															
	Knowledge and Understanding					Intellectual				Practical				Transferable		
	A1	A2	A3	A4		B1	B2	B3		C1	C2	C3		D1	D2	D3
Lectures	X	X	X	X		X								X		
Laboratory						X				X	X	X			X	
Writing Reports			X	X			X	X								X

Assessment Methods-ILOs

Courses	Programme outcomes ILOs																
	Knowledge and Understanding					Intellectual				Practical				Transferable			
	A1	A2	A3	A4		B1	B2	B3		C1	C2	C3		D1	D2	D3	
Written Examination	X	X	X	X			X								X		
Practical Examination			X			X				X	X	X			X		
Semester work			X	X				X						X	X	X	

Course Title	**Computer**	
Course Code	**2044**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Mohamed El-Awady**	
Other Staff	**Prof. Mahmoud Kamel, Prof. Qadry Zakaria**	
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc.**	
Course Delivery	**Lecture**	**28 x 1h lectures**
	Practical	**28 x 1h practical**
Parent Department	**Computer Centre**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to acquire a range of transferable skills that are important for post graduate M. Sc. students to:

1) Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.
2) Underpin academic work throughout postgraduate studies.
3) Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. The use of IT in the context of their postgraduate studies.
A2. The diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.
A3. Necessary graphical, statistical and frequency analyses of different types of data.
A4. Powerful presentation using sophisticated software packages.
A5. Different internet resources.
A6. Solution of scientific problems using computer programming.
A7. Photo enhancing and manipulation techniques.

B. Intellectual skills:

They should also acquire the ability to:

B2. Integrate different application programs to develop effective information analysis and presentation.

C. Professional and practical skills:

C1. Use a number of computer packages to present information.

D. General and transferable skills:

D2. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Analysis and design of research studies (one hour/week)

Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.
Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.
Lectures 27-28	Design of experiments: The null hypothesis, statistical significance and rejecting the null hypothesis.
Weeks 29, 30	**Assessment**

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Assignments

The course is delivered through lectures, practical sessions and assignments. Team working skills are developed on a week-long laboratory exercises and the students present and defend their findings in a public seminar.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

	Course Coordinator	Head of Department
Name	Prof. Mohamed M. El-Awady	Prof. El-Said Taha Rizk
Name (Arabic)	أ.د. محمد العوضي	أ.د. السيد طه رزق
Signature	……………………………	………………………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Contents	Knowledge and Understanding							Practical	Transferable	
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Methods for graphical representations	☒	☒	☐	☐				☒	☒	☐
Statistical Data analysis	☒	☒	☐	☐				☒	☒	☐
Creating powerful presentation	☒	☒	☒	☒				☒	☒	☐
Use of internet capabilities and searching engines	☒	☒	☐	☒	☒			☒	☒	☐
Creating Data	☒	☒	☒	☐				☒	☒	☒
Computer programming language	☒	☒	☒	☐		☒		☒	☒	☒
Photo manipulation	☒	☒	☐	☒			☒	☐	☒	☒
Introduction to Data frequency analysis	☒	☒	☐	☒		☒		☐	☒	☒

Learning and Teaching Methods-ILOs

Contents	Knowledge and Understanding							Intellectual skills	Practical	Transferable
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Lectures	X	X	X	X	X		X			
Practical classes								X	X	X
Assignments						X				X

Assessment Methods-ILOs

Contents	Knowledge and Understanding							Intellectual skills	Practical	Transferable
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Lectures	X	X	X	X	X		X			
Practical Examination								X	X	X
Semester work						X		X		X

Course Title	**Statistics**	
Course Code	**1618**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Kadry Zakaria Elsherbeny**	
Other staff		
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc. in Geology or Geophysics**	
Course delivery	**Lecture**	**28 x 1h lectures**
	Practical	**-**
Parent Department	**Mathematics Department**	
Date of approval	**September, 2014**	

1. Aims

This module aims to provide M. Sc. students in geology with basic concepts of study design and data analysis suitable for laboratory and field research, and to help students to develop the skills needed to apply statistical methods using related statistical software; e.g. Primer or GraphPad in scientific geological research. Emphasis will be on practical and applied skills using example of relevance to geology students.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

- A5. Statistical issues such as statistical measures for data description; statistical estimation; correlations and testing hypothesis.
- A6. Study design.
- A7. Types of variables that are used in geological research.
- A8. Role of sampling variation, how to quantify the variability, and its role in comparing groups or categories.

B. Intellectual skills:

- B5. Carry out confidently simple essential statistical methods in geological research and to interpret results.
- B6. Select appropriate statistical methods for analysis of simple data sets and apply them on a computer using geo-statistical software, GraphPad.

B7. Summaries data using graphical and tabular data.

B8. Interpret research findings and explain them in a clear, concise and logical manner.

C. Professional and practical skills

C4. Select and apply appropriate basic statistical methods for analysis of data.

C5. Use GraphPad package in data analysis.

C6. Tackle skills in handling data on a computer and otherwise, and deriving and presenting quantitative results using appropriate tables, figures, and summaries.

D. Transferable skills

D4. Write report including graphical material.

D5. Present and discuss the finding from statistical analysis in a clear, concise and logical manner.

D6. Use internet and other electronic sources as a source of information.

3. Contents

Analysis and design of research studies (two hours/week)

Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.
Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.
Lectures 27-28	Design of experiments: The null hypothesis, statistical significance

and rejecting the null hypothesis.

Weeks 29, 30 **Assessment**

4. Teaching and Learning Methods

- Lectures are an integral part of course delivery in this course, supported by problems classes, tutorial groups, computational work, office hours, and individual tutorials.
- Students engage in private study in which they work through set problem sheets and individual assignments as well as assimilating lecture content.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 16th Week	90%
Oral Assessment	KU, I	Assessment Session	Term Final	5%
Semester work	KU, I	Continuous Assessment		5%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential books

- Glantz, Stanton A. (2005): Primer of Biostatistics, 6th Edition McGraw-Hill.

Recommended books

- Samuels, M. L. (1989): Statistics for the Life Sciences. Dellen Publishing Company, USA.
- Rosner, B. (1990): Fundamentals of Biostatistics. PWS-Kent Publishing Company, USA.

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computers Presentations and Writing Boards
- Primer or GraphPad biostatistics software.

	Course Coordinator	Head of Department
Name	Prof. Kadry Zakaria Elsherbeny	Prof. Kadry Zakaria Elsherbeny
Name (Arabic)	أ. د. قدرى زكريا الشربينى	أ. د. قدرى زكريا الشربينى
Signature	…………………………………..	………………………………
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	Programme outcomes ILOs													
	Knowledge and Understanding				Intellectual				Practical			Transferable		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3
Introduction	☒	☒	☒	☒	☒	☒	☐	☒	☐	☐	☒	☒	☒	☐
Summarizing data	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐	☒	☐	☐
Sampling variability of a mean	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐	☒	☐	☐
Analysis of quantitative data	☒	☐	☐	☐	☒	☒	☒	☒	☐	☒	☒	☒	☐	☐
ANOVA	☒	☐	☐	☐	☒	☒	☐	☒	☐	☒	☒	☒	☒	☐
Sampling variability of proportions	☒	☒	☒	☒	☐	☒	☒	☒	☐	☒	☒	☒	☒	☐
Analysis of categorical data	☒	☒	☒	☒	☐	☒	☒	☒	☐	☒	☒	☒	☒	☐
Regression and correlation	☒	☒	☒	☒	☐	☐	☒	☒	☐	☒	☒	☐	☒	☒
Comparing correlations	☒	☒	☒	☐	☐	☐	☒	☒	☐	☒	☒	☐	☒	☒
Regression and correlation.	☒	☒	☒	☐	☐	☐	☒	☒	☐	☒	☒	☐	☒	☒
Comparing distribution	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒
Comparing means	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒	☐	☐	☒	☐
Comparing variances	☒	☒	☒	☐	☐	☐	☐	☐	☐	☒	☒	☐	☒	☒
Design of experiments	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☒	☐	☒	☒

`Learning and Teaching Methods-ILOs

Courses	Programme outcomes ILOs														
	Knowledge and Understanding					Intellectual				Practical		Transferable			
	A1	A2	A3	A4		B1	B2	B3	B4			D1	D2	D3	
Lectures	X	X	X			X	X	X				X	X		
private study				X					X					X	

Assessment Methods-ILOs

Courses	Programme outcomes ILOs															
	Knowledge and Understanding					Intellectual				Practical			Transferable			
	A1	A2	A3	A4		B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	
Written Examination	X	X	X	X		X	X									
Oral Assessment								X	X					X		
Semester work									X				X		X	

M.Sc. Programme
of
Mineralogy & Petrology

A. Programme Specification

Programme Title	**Master of Mineralogy and Petrology**
Award	**Master of Mineralogy and Petrology**
Parent Department	**Geology Department**
Teaching Institution	**Faculty of Science - TU**
Awarding Institution	**Tanta University**
Coordinator	**Prof. Ibrahim A. Salem**
External Evaluator(s)	**Prof. Dr. Salah N. Ayad, Professor of Geology, Faculty of Science, Mansura University**
QAA Benchmarking Standards	**Academic Reference Standards (ARS)**
Other Reference Points	
Date of intake	**Every year in September**
Review Date	**Internal Periodic Review, Summer 2014**
Date of Approval	**September, 2014**

1. **Aims**

   The primary purpose of this programme is to provide graduate geologists with the advanced conceptual understanding, detailed factual knowledge and an awareness of responsibilities to society and the environment appropriate for success as mineralogy and petrology geologists participating in a range of contexts (e.g. ore exploration, mineral industries). In addition to these academic skills, the programme also aims to equip its graduates with a suite of transferable skills, including the ability to communicate effectively, the ability to employ IT and library resources appropriately, the ability to priorities work and to meet deadlines, the ability to work alone and with others, and the ability to use initiative and to solve problems.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire advanced knowledge and understanding of:

A1. Formation of melts and fluids under the conditions of the Earth's crust and mantle, mineral synthesis, phase transformation, mineral equilibria, and X-ray diffraction and DTA, IR and Raman spectroscopy of minerals .

A2. Chemical processes and reactions that govern the composition of rocks and the cycles of matter and energy that transport the Earth's chemical components in time and space.
A3. Origin and evolution of the igneous, sedimentary metamorphic rocks through time and space and in relation to the moving tectonic plate.
A4. Classification of metallogenic environments and episodes in relation to the history of the Earth,
A5. Industrial applications and uses of minerals.

B. Intellectual skills:

They will also acquire the ability to:

B4. Formulate and test hypotheses.
B5. Plan and execute laboratory investigation or development work, evaluate the outcomes and draw valid conclusions.
B6. Apply advanced geological principles to the solution of a complex problem related to mineralogy and petrology.
B7. Analyse, synthesise and assimilate diverse information in a critical manner.
B8. Construct reasoned arguments to support a position on the ethical and social impact of scientific advances and appreciate the existence of different points of view.

C. Professional and practical skills:

C7. Record, collect, analyse and report data of laboratory and field investigations.
C8. Undertake laboratory and field investigations in a liable, safe and ethical manner.
C9. Plan and conduct various forms of laboratory and field investigations in specific, precise and accurate manner.

D. General and transferable skills:

D9. Communicate about a subject clearly, confidently and effectively using a range of presentational techniques.
D10. Efficiently use general IT skills with confidence and accuracy.
D11. Work both independently and in collaboration with others.
D12. Take responsibility for self-managed learning and personal/professional development.
D13. Plan, organize and prioritize work activities in order to meet deadlines

3. Academic standards

3.A External references for standards (Benchmarks):

Academic Reference Standards (ARS)

3.B Comparison of provision to external references:

International-Academic Reference Standards.

3. Academic Reference Srandards:

The Academic Reference Standards for the program of the M.Sc. degree in Mineralogy and Petrology as well as the attributes and capabilities of the graduates were based essentially on the **General Academic Reference Standards (ARS) of graduate studies** published by the National Authority for Quality Assurance and Accreditation of Education (NAQAAE 2009). The following Specific Academic Standards for the Master Degree in Mineralogy and Petrology are adopted and were approved by the Faculty Council in 20/11/2012

Specific Academic Reference Standards

3.1 Graduate Attributes

The postgraduates of M.Sc. in Mineralogy and Petrology must have been prepared for:

1.1 Systematic understanding and critical awareness of topics in the area of mineralogy and petrology.

1.2 Apply the knowledge of geology, its related disciplines, applications and tools to the solution of the scientific research problems in the fields of research in mineralogy and petrology (e.g. ore exploration, mineral industries).

1.3 Generic skills, which are appropriately developed by professional practices.

1.4 Advanced studies in the area of mineralogy and petrology to support research work.

1.5 Information gathering, evaluation of published information, critical analysis of data.

1.6. Develop a wide range of key skills (employ IT and library resources appropriately, priorities work, meet deadlines and assess problem domains and formulate problem-solving strategies), group and individual presentations, reporting, and group tutorial discussions.

3.2. Knowledge and Understanding

By the end of the M.Sc. program, the postgraduate students must be able to acquire knowledge and understanding of:

2.1 In-depth knowledge of the core themes of mineralogy and petrology.

2.2 Different important procedures and techniques used in the field of mineralogy and petrology analyses.

2.3 The ethics and bases of scientific research in general and that of the mineralogy and petrology research in particular.

2.4 Theories of mineralogy and petrology and broaden his/her scope of theories of other interdisciplinary fields.

3.3. Intellectual Skills

By the end of the M.Sc. program, the postgraduate students must be able to:

3.1- Apply the knowledge of the mineralogy and petrology.

3.2- Differentiate mineralogy and petrology problem-solving procedures and techniques.

3.3- Identify and analyze problems critically, set priorities and make professional decisions.

3.4- Develop a scientific technical planning based on sufficient mineralogy and petrology field observations.

3.5- Test and analyze hypotheses in the field of mineralogy and petrology deal with relevant to problems.

3.4. Practical and Professional Skills

By the end of the M.Sc. program, the postgraduate students must be able to:

4.1- Critically evaluate and present mineralogy and petrology research.

4.2- Appreciate kinds of data limitation and accuracy.

4.3- Write professional reports efficiently.

4.4- Create plans to maximize the quality of the mineralogy and petrology analytical performance.

4.5- Evaluate resources of data in the mineralogy and petrology research and renovate them.

3.5. General and Transferable Skills

By the end of the M.Sc. program, the postgraduate students must be able to:

5.1- Attain an independent learning technique for a lifetime, professional career development in the field of mineralogy and petrology.

5.2- Work out initiative plans and deal with stress and time management.

5.3- Communicate verbally and exchange the results and information successfully.

5.4- Use information and communication technology.

1. , after a in the first two years of study, to

The programme includes one year of coursework for thorough grounding. This one year of coursework permits the students a high degree of choice to suit their aptitudes and career ambitions to precede a research project, i.e. the Master thesis, by laboratory investigation in a mentored environment.

- Assessment is held by the end of the first year, and student will be eligible only on attaining a “pass” degree (60%).
- The student who fails certain course at the first attempt will be eligible for only a “Pass” degree following only one re-set examination.
- The student can submit his thesis only after one year from the date of the Faculty Council approval on the thesis subject.

4. Curriculum Structure and contents:

4.A	Programme duration		At most Five years					
4.B	Coursework structure		One Year					
4.B.1	Number of contact hours		per Week:					
		First term:	Lectures	14	Lab.	1	Total	14
		Second term:	Lectures	14	Lab.	1	Total	14
	Overall	Contact hours	Lectures	28	Lab.	2	Total	28
4.B.2	Number of contact hours		Compulsory	28	Optional	None	Optional	None
4.C.	Thesis							

5. Programme courses

Year 1	Course Title	Lec.	Prac.	Exer.	Program ILOs Covered
Code	Three of the first six courses are obligatory, the last three ones are obligatory and a course from either the Paleontology and Stratigraphy or the Applied Geophysics M.Sc. Programs is obligatory.	Hours			
1411	Experimental Mineralogy	2	-	-	
1412	Geochemistry	2	-	-	
1413	Mineral Deposits and Ore Microscopy	2	-	-	
1414	Igneous and Metamorphic Petrology	2	-	-	
1415	Sedimentary Petrology	2	-	-	
1416	Industrial and Radioactive Minerals	2	-	-	
1417	Essay	2	-	-	
1418	Statistics	1	-	-	
1419	Computer	1	1		

6. Programme admission requirements

The applicants must have obtained a Bachelor's degree, or its equivalent, in Geology with a "good" degree as a minimum for approval.

7. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression:

- The programme includes one year of coursework, followed by a research project, i.e. the Master thesis, by laboratory investigation in a mentored environment.
- Assessment is held by the end of the first year, and student will be eligible only on attaining a "pass" degree (60%).
- The student who fails certain course at the first attempt will be eligible for only a "Pass" degree following only one re-set examination.

- The student can submit his thesis only after one year from the date of the Faculty Council approval on the thesis subject.

8. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Not applied yet	
2. Alumni	Not applied yet	
3. Stakeholders (Employers)	Not applied yet	
4. External Evaluator(s) (External Examiner(s))	Prof. Salah N. Ayad	

Thesis

The thesis of M.Sc. in Mineralogy and Petrology is a formal written document representing sustained research contributes to the accumulated understanding of the Mineralogy and Petrology field. Throughout the preparation of the thesis student demonstrate in-depth, specialist knowledge and sophisticated understanding of concepts, information and techniques at the forefront of the discipline; exhibit mastery in the exercise of intellectual abilities including theoretical and practical skills; take a proactive and self-reflective role in working and to develop professional relationships with others; proactively formulate ideas and hypotheses; evaluate current issues; develop, implement and execute plans meeting deadlines and to employ IT and library resources appropriately

Responsibility for different phases in the preparation and checking of a graduate thesis rests jointly with the student, the members of supervision committee and the graduate office. The supervision committee may control of the following:

1. Thesis divisions and their order
2. Terminology for the division
3. The arrangement of reference material.

A graduate thesis is a permanent evidence of contribution made by students in particular field of knowledge and should reflect credit on the University as well as on the students. Student has a duty to present findings not only with precision, but also intelligently and attractively.
A thesis must include all the significant results obtained and must disclose all the methods and processes employed in research in such a detail that the work may be repeated by anyone skilled in the field. The student should be scrupulously careful to give references to all the work on which the thesis depends directly or significantly. Good usage requires documentation of statements whenever possible by reference to published and unpublished.

The thesis should contain the following:

- Title page (title, name of student, university, faculty, name of program, date, supervisors)
- Table of contents
- Introduction, containing a definition of the thesis statement and the aim.
- Literature review.
- Materials and methods.
- Results.
- Discussion and conclusions.
- References.

Language of the thesis:

- The thesis is written in English accompanied by a summary in Arabic.

One accepted paper is required

- Before the thesis can be presented for granting the M.Sc. degree, at least one accepted paper is required

Apply the thesis to the Department Council

- With the approval of the thesis by the supervision committee, the student can apply the thesis to the Department Council.

Examiners Committee

- The examiners committee is selected by Geology Department Council. The M.Sc. Degree is awarded to the applicant by Tanta University Council, upon the recommendation of the department and the Faculty Council.

We certify that all of the information required to deliver this programme is contained in the above specification and will be implemented. All course specifications for this program are in place.

Name	Signature	Date
Programme Coordinator: Prof. Ibrahim A. Salem أ. د. ابراهيم عبد الناجي سالم	…….……..………..…	/9/2014
Head of Quality Assurance Unit: Prof. Hoda Kamal أ.د.هدى كمال	…….……..………..…	/9/2014
Dean of the Faculty: Prof. Tarek Abd elmoniem Fayed أ.د. طارق عبد المنعم فايد	…….……..………..…	/9/2014

Courses– Programme ILOs Matrix

Courses	Programme outcomes ILOs															
	Knowledge and Understanding				Intellectual					Practical			Transferable			
	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4
1411 Experimental Mineralogy	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
1412Geochemistry	☒	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒
1413 Mineral Deposits and Ore Microscopy	☒	☐	☒	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐	☒	☐	☒
1414 Igneous and Metamorphic Petrology	☐	☐	☒	☒	☐	☐	☐	☒	☐	☐	☐	☐	☒	☒	☐	☒
1415 Sedimentary Petrology	☒	☐	☒	☒	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒
1416 Industrial and Radioactive Minerals	☒	☒	☐	☐	☒	☒	☐	☐	☒	☐	☐	☐	☒	☐	☒	☒
1417 Essay	☒	☒	☐	☐	☒	☒	☐	☐	☒	☐	☐	☐	☒	☐	☒	☒
1418 Statistics	☒	☒	☐	☐	☒	☒	☐	☐	☒	☐	☐	☐	☒	☐	☒	☒
1419 Computer	☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☒	☐	☒	☒
Thesis					☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒

Course Title	**Experimental Mineralogy**	
Course Code	**1411**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Hassan Z. Harraz**	
Other Staff		
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. Geology**	
Course Delivery	**Lecture**	**28 x 2h Lectures**
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

This course aims to enable students to gain broad knowledge and understanding of experiment results on minerals and on the relationship between experimental mineralogy and petrology.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

- A5. Methods of mineral identification including X-ray diffraction, DTA, IR and Raman spectroscopy.
- A6. Chemistry of minerals.
- A7. Phase transformations.

B. Intellectual skills:

They will also acquire the ability to:

- B4. Predict mineral composition and structure.
- B5. Analyze the phase diagrams.
- B6. Depict the rocks from minerals.
- B7. Differentiate the pressure and temperature conditions of different mineral transformations.

D. General and transferable skills:

- D1. Write reports and give oral representation.

D2. Retrieve information from literature/databases using IT and library

D3. Find effective solution for problem involving complex information.

D4. Work independently and in a team.

3. Contents

Lecture 1	Introduction
Lectures 2-7	Mineral chemistry
Lectures 8-14	Phase equilibrium, phase rule
Lectures 15-22	Determinative mineralogy: XRD, DTA, IR and Raman spectroscopy
Lectures 23-28	Thermobarametry.
Weeks 29, 30	**Assessment**

4. Teaching and Learning Methods

- Lectures
- Discussions
- Term paper and reports
- Web searching
- Assignments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

-Deer. W. A., Howie, R.A., Zussman, J. (1974): An introduction to the rock-forming minerals. Longman,

- Ernst, W. G. (1976): petrologic phase equilibria. Freeman and Comp. 333P.

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.

- XRD, IR and Raman Spectroscopy.

- Software package.

	Course Coordinator	Head of Department
Name	Prof. Hassan Z. Harraz	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د. حسن زكريا حراز	أ. د. عبدالفتاح على زلط
Signature	……………………………..	…………………………………
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Contents	Course outcomes ILOs										
	Knowledge and Understanding			Intellectual				Transferable			
	A1	A2	A3	B1	B2	B3	B4	D1	D2	D3	D4
Introduction	☒	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒
Mineral chemistry	☐	☒	☐	☐	☐	☒	☐	☒	☒	☒	☒
Phase equilibrium, phase rule	☐	☐	☒	☐	☒	☐	☒	☒	☒	☒	☒
Determinative mineralogy	☒	☐	☒	☒	☐	☐	☐	☐	☒	☐	☒
Thermobarametry	☐	☒	☒	☐	☒	☐	☒	☒	☒	☒	☒

Learning and Teaching Methods-ILOs

Learning Methods	Knowledge and understanding			Intellectual Skills				General and Transferable Skills			
	A1	A2	A3	B1	B2	B3	B4	D1	D2	D3	D4
Lectures	√	√	√							√	
Discussions	√		√	√	√	√	√			√	√
Term paper and reports		√						√		√	
Web searching	√	√		√	√	√	√		√		√
Assignments		√	√	√	√	√	√	√	√	√	√

Assessment Methods-ILOs

Assessment Methods	Knowledge and understanding			Intellectual Skills				General and Transferable Skills			
	A1	A2	A3	B1	B2	B3	B4	D1	D2	D3	D4
Written Examination	√	√	√	√	√	√	√			√	
Oral Assessment	√	√	√	√	√	√	√			√	√
Semester work	√	√		√	√			√	√		√

Course coordinator:

Head of Department:

Course Title	**Geochemistry**	
Course Code	**1412**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Mohamed F. Ghoneim**	
Other Staff	**Prof. Mohamed M. Abu Anbar, Prof. Mohamed M. Hamdy**	
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. Geology**	
Course Delivery	**Lecture**	**28 x 2h Lectures**
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

This course aims to enable students to acquire advanced conceptual understanding, detailed factual knowledge of theoretical, analytical and applied aspects of geochemistry and emphasize a quantitative approach to geochemistry as well as developing a qualitative understanding of geochemical processes. The course also aims to develop critical, analytical problem solving skills and the transferable skills related to geochemistry.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of:

A1. Equilibrium thermodynamic, elemental partitioning, partition coefficient, simple and exchange reactions, and fluid/rock interaction.

A2. REEs compositions in Earth's reservoirs.

A3. Stable and radiogenic isotope methods in the study of the Earth's major geochemical cycles.

A4. Compositional variations of mineral chemistry with the different geologic processes.

A5. Geochemical techniques (XRF, NNA, ICP, LA-ICP for whole-rocks and EMPA, IMPA for minerals) applicable to the research.

B. Intellectual skills:

They will also acquire the ability to:

B1. Apply elemental partitioning in petrogenetic studies

B2. Estimate with more precision the Earth's processes using the distribution of REE

B3. Discriminate between tectonic environments, melting, crystallization and enrichment processes in rocks basing on the chemical compositions of minerals.

B4. Compare between behavior and compatibility of stable isotopes of different elements during Earth's processes and systems gaining the experience to select the proper isotope systems study.

B5. Infer the chemical characteristic of long-lived geochemical reservoirs using radiogenic isotopes as tracers for mixing of materials from different reservoirs.

D. General and transferable skills:

D1. Enhance self- and continuous learning in the field of specialty.

D2. Write reports and give oral representation.

D3. Find effective solution for problem involving complex information.

3. Contents

Lectures 1,2	Basic chemistry and thermodynamics for equilibrium models.
Lectures 3-6	Elemental partitioning, partition coefficient, simple and exchange reactions, application in petrogenetic studies.
Lectures 7-10	Fluid chemistry and rock/fluid interaction
Lectures 11,12	Geochemistry of rare earth elements REE and its distribution
Lectures 13,16	Estimation of melting and crystallization degrees from chemistry of rock-forming minerals.
Lectures 17,18	Stable isotope fractionations and source of fluids
Lectures 19,20	Geochemistry of Nobel metals
Lectures 21,24	Systems of radiogenic isotopes and isotope decay

Lectures 25-28	Analytical methods for elements and isotopes in whole-rocks (XRF, NNA, ICP, LA-ICP) and minerals (EMPA, IMPA)
Weeks 29, 30	**Assessment**

4. Teaching and Learning Methods

- Lectures
- Discussions
- Term paper and reports
- Web searching
- Assignments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		
Oral Assessment	KU, I	Assessment Session		
Semester work	KU, I	Continuous Assessment		

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

Principles of Geochemistry "Mason, 1966"

-lectures on geochemistry "Open university"

-Data in Geochemistry (using geochemical data), "Roltison, 1993"

Recommended Books:

- Hoefs J 1987: Stable isotope geochemistry. [**For Geochemistry Course**]

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.

	Course Coordinator	Head of Department
Name	Prof. Mohamed F. Ghoneim	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د. محمد فؤاد غنيم	أ. د. عبدالفتاح على زلط
Signature	……………………………………..	……………………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Contents	Course outcomes ILOs												
	Knowledge and Understanding					Intellectual					Transferable		
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	D1	D2	D3
Basic chemistry and thermodynamics	☒	⊟	⊟	⊟	⊟	⊟	⊟	⊟	⊟	⊟	☒	⊟	⊟
Elemental partitioning, partition coefficient	☒	☐	☐	☐	⊟	☒	☐	☐	☐	☐	☒	☐	☐
Fluid chemistry and rock-fluid interaction	☒	☐	☐	☐	⊟	☐	☐	☐	☐	☐	☒	☒	☐
Geochemistry of rare earth elements REE and its distribution	☐	☒	☐	☐	⊟	☐	☒	☐	☐	☐	☐	☒	☐
Estimation of melting	☐	☐	☐	☒	⊟	☐	☐	☒	☐	☐	☐	☒	☒
Stable isotope fractionations	☐	☐	☒	☐	⊟	☐	☐	☐	☒	☐	☐	☒	☒
Systems of radiogenic isotopes and isotope decay	☐	☐	☒	☐	⊟	☐	☐	☐	☐	☒	☐	☒	☒
Analytical methods for elements and isotopes in whole-rocks	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐

Learning and Teaching Methods-ILOs

Learning Methods	Knowledge and understanding					Intellectual Skills					General and Transferable Skills		
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	D1	D2	D3
Lectures	√	√	√	√	√								
Discussions		√	√			√	√	√	√	√		√	√
Term paper and reports				√	√		√		√	√	√	√	√
Web searching	√	√	√		√	√					√		√
Assignments		√		√		√		√	√	√	√	√	√

Assessment Methods-ILOs

Learning Methods	Knowledge and understanding					Intellectual Skills					General and Transferable Skills		
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	D1	D2	D3
Written Examination	√	√	√	√	√	√	√	√	√	√		√	
Oral Assessment		√			√	√	√	√	√	√		√	√
Semester work	√		√			√		√	√		√	√	√

Course coordinator:

Head of Department:

Course Title	**Mineral Deposits and Ore Microscopy**	
Course Code	**1413**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Ibrahim A. Salem**	
Other Staff	**Prof. Hassan Z. Harraz**	
	Prof. Bothina T. El Dousky	
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. Geology**	
Course Delivery	**Lecture**	**28 x 2h Lecture**
Parent Department	**Geology Department**	
Date of Approval	**September , 2014**	

1. Aims

This course consists of two parts. The first part aims to enable students to gain broad knowledge and understanding of genetic models of mineral deposits and their relations to tectonic movements. The second part aims to acquire advanced concrete understanding and detailed knowledge of microscopy of opaque minerals including textures, fluid inclusions and mineral paragensis in igneous, sedimentary and metamorphic ores.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of:

A1. Genetic models of mineral deposits and their relations to tectonic movements.

A2. Microscopic properties of metallic and non-metallic ore minerals.

A3. Ore textures~~,~~ and mineral paragensis.

A4. Types and significance of fluid inclusions.

B. Intellectual skills:

They will also acquire the ability to:

B1. Discriminate and estimate genetic models of different mineral deposits.

B2. Characterize the tectonic environments of the different mineral deposits.

B3. Estimate the paragenetic sequence in in different ores.

B4. Estimate the P-T conditions and compositions of the mineralizing fluids.

D. General and transferable skills:

D1. Write reports and give oral representation.

D2. Use IT and library to get information.

D3. Find effective solution for problem involving complex information.

D4. Work independently and in a team.

3. Contents

Lectures 1-5	Magmatic deposits and their relation to tectonic movement
Lectures 5-9	Sedimentary deposits and their relation to tectonic movement
Lectures 10-14	Metamorphic deposits and their relation to tectonic movement
Lectures 14-17	microscopic properties of metallic and non-metallic ore minerals, Paragenesis, geothermometry, fluid inclusions
Lectures 17-21	Ore mineral textures and paragenesis in igneous rocks
Lectures 22-28	Ore mineral textures and paragenesis in metamorphic and sedimentary rocks.
Weeks 29,30	**Assessment**

4. Teaching and Learning Methods

- Lectures
- Discussions
- Term paper and reports
- Web searching
- Assignments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

- Economic mineral deposits (Jensen & Bateman, 1985)

- Ore microscopy and ore petrology (Craig & Vaughan, 1982)

Recommended Books:

- Ore genesis (Asoke Mookherjee, 1999)

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.

	Course Coordinator	**Head of Department**
Name	Prof. Ibrahim A.salem	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د. إبراهيم عبد الناجي سالم	أ. د. عبدالفتاح على زلط
Signature	……………………………………..	…………………………………..
Date	9/2014	9/2014

Course Contents – Course ILOs Matrix

Contents	Knowledge and understanding				Intellectual Skills				General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	D1	D2	D3	D4
Magmatic deposits	√				√	√				√	√	√
Sedimentary deposits	√				√	√				√	√	√
Metamorphic deposits	√				√	√				√	√	√
microscopic properties of metallic and non-metallic ore minerals		√		√				√	√		√	√
Ore mineral textures			√				√		√			√
Ore mineral textures			√				√		√			√

Learning and Teaching Methods-ILOs

Learning and teaching method	Knowledge and understanding				Intellectual Skills				General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	D1	D2	D3	D4
Lectures	√	√	√	√								
Discussions					√	√	√	√			√	√
Term paper and reports					√	√	√	√	√		√	√
Web searching					√	√				√		√
Assignments					√	√			√		√	√

Assessment Methods-ILOs

Learning Methods	Knowledge and understanding				Intellectual Skills				General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	D1	D2	D3	D4
Written Examination	√	√	√	√	√	√	√	√				

Course Title	**Igneous Petrology**	
	Metamorphic Petrology	
Course Code	**1414**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Abdel Salam R. Abu El Ela**	
Other Staff	**Prof. Gaafar A. Baharyia**	
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. Geology**	
Course Delivery	**Lecture**	**28 x 2h. Lecture**
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

This course is in two sections. The first section aims to enable students to acquire knowledge and critical understanding of the field observation of igneous rocks, origin and evolution through time and space and in relation to the moving tectonic plates. **The second section aims to** enable students to acquire deep knowledge and understanding of metamorphic rocks classification and processes and the relation of metamorphism to the global tectonic history.

2. Intended Learning outcomes

A. *Knowledge and understanding:*

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

- A1. Generation of magma in mantle and crust, magmatic gases and volatile components, oxygen fugacity, phase equilibrium of binary and ternary systems.
- A2. Petrogenesis of basalts and granites in relation to tectonic environments, ophiolite suites,
- A3. Classifications and origin of lamprophyre, carbonatite, Nepheline Syenites and kimberlite.
- A4. Recent trends in classification of metamorphic rocks, polymorphic transition, geothermo-barometry, composition-paragenesis diagrams, metamorphic differentiation and anatexis.
- A5. Paired metamorphic belts, tectonic history of metamorphism.

A6. Characters, composition, classification and genesis of amphibolites, serpentinites, and eclogites

B. *Intellectual skills:*

They will also acquire the ability to

B1. Differentiate magmas formed in mantle and crust

B2. Deduce the tectonic environments of formation of basalts and granites.

B3. Recognize the type and origin of ophiolite, lamprophyre, carbonatite, nepheline syenites kimberlite, komatiite and anorthosite.

B4. Estimate the thermo-barometric conditions of the metamorphism.

B5. Recognize the tectonic history of metamorphism.

D. *General and transferable skills:*

D1. Communicate effectively in writing and verbally.

D2. Employ IT and library resources appropriately.

D3. Find effective solution for problem involving complex information.

D4. Work independently and in a team.

3. Contents

Part -1	**Igneous Petrology** (An hour/week)
Lecturers 1,2	Generation of magma in mantle and crust.
Lecturers 3-5	Magmatic gases and volatile components, Oxygen fugacity, Factors for magma crystallization (nucleation and crystal growth).
Lecturers 6-8	Phase equilibrium studies of binary system with eutectic (Di-An), peritectic (Fo-Silica) and solid solution relation (Ab-An) and ternary system (Di-Ab-An) and their significance.
Lecturers 9-11	Classification of basalts, Generation of basalts: parent materials, primary origins, secondary origins. Petrogenesis of basalts in relation to tectonic environment
Lecturers 12-14	Ophiolite suites and their petrogenesis
Lecturers 15-17	Classification of granites (I, S, M, A types). Granite in various tectonic environments. Petrogenesis of granites: source materials, sediments and metasediments, basalt or andesites.
Lecturers18-20	Petrological and geochemical characters of pegmatites and their petrogenesis
Lecturers 21,22	Petrological characters, classification and petrogenesis of Lamprophyres
Lecturers23,24	Mineral composition, classification and petrogenesis of Carbonatites

	and Nepheline Syenites.
Lecturers 25,26	Mineralogy of Kimberlites and their petrogenesis.
Lecturers 27,28	Petrography, composition and petrogenesis of Komatiite and Anorthosite
Part -2	**Metamorphic Petrology** (An hour/week)
Lecturers 1-3	Recent trends in classification of metamorphic rocks
Lecturers 4-9	Metamorphic reactions, polymorphic transition, solid-solid, solid-gas application to geothermo-barometry
Lecturers10-14	Composition-paragenesis diagrams, ACF and AKF diagrams, AFM projections
Lecturers 14-17	Metamorphic differentiation and anatexis in metamorphic rocks and granite magmas.
Lecturers 18,19	Paired metamorphic belts and their significance
Lecturers 20,21	Global plate tectonics and metamorphism
Lecturers 22,23	Mineralogy, texture, chemical composition, types and petrogenesis of Amphibolites
Lecturers 24-26	Mineralogy, texture, chemical composition, types and petrogenesis of serpentinites
Lecturers 27,28	Characters, composition, classification and genesis of Eclogites.
Weeks 29,30	Assessment

4. Teaching and Learning Methods

- Lectures
- Group workshops discussion
- Assignments
- Writing reports

5. Student Assessment

Assessment Method	**Skills assessed***	**Assessment Length**	**Schedule**	**Proportion**
Written Examination	KU, I	3 Hour Examination	The 29th Week	100%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

- *petrology; Ehlers, E.G., Blatt,H(1982).*
- Igneous petrology ; MCBirney,A.R. ; 2007

- Quantitative textural measurements in igneous and metamorphic petrology ; Hiqqins,M.D.; 2006 .

Recommended Books:

- Petrology and genesis of igneous rocks ; Gupta,A.K. ; 2007

- Principles of metamorphic petrology ; Vermon, R.H. ; 2008

Periodicals, Web sites:

- Journal of Petrology,

- Precambrian Geology,

- Journal of Metamorphic Geology,

- Contributions to Mineralogy and Petrology

7. Facilities required for teaching and learning

- Video Projectors

- Computer Presentations

- Library

	Course Coordinator	**Head of Department**
Name	Prof. Abdel Salam R. Abu El Ela	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د. عبد السلام رشاد أبو العلا	أ.د. عبدالفتاح على زلط
Signature	…………………………………	………………………………..
Date	9/2014	9/2014

Course Contents – Course ILOs Matrix

Contents	Course outcomes ILOs														
	Knowledge and Understanding						Intellectual					Transferable			
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	D1	D2	D3	D4
Part -1 Igneous Petrology															
Generation of magma	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐
Magmatic gases and volatile components	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Phase equilibrium studies of binary system with eutectic (Di-An	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐
Classification of basalts	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒
Ophiolite suites and their petrogenesis	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☒	☒	☒	☒
classification of granites (I, S, M, A types)	☐	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒
Petrological and geochemical characters of pegmatites	☐	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒
Petrological characters	☐	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒
Mineral composition, classification	☐	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒
Mineralogy of Kimberlites	☐	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐	☒	☒	☒	☒
Petrography	☐	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒
Part -2 Metamorphic Petrology															
Recent trends in classification of metamorphic rocks	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐
Metamorphic reactions	☐	☐	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☒
Composition-paragenesis diagrams,	☐	☐	☐	☒	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☒
Metamorphic differentiation and anatexis	☐	☐	☐	☒	☐	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐
Paired metamorphic belts	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒

Contents	Course outcomes ILOs														
	Knowledge and Understanding						Intellectual					Transferable			
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	D1	D2	D3	D4
Global plate tectonics and metamorphism	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☒	☒	☒	☒	☒
Mineralogy,tes	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☒	☒
Mineralogy, texture, chemical composition, types and petrogenesis of serpentinites	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☒	☒
Characters, composition, classification and genesis of Eclogites.	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☒	☒

Learning and Teaching Methods-ILOs

Contents	Course outcomes ILOs														
	Knowledge and Understanding						Intellectual					Transferable			
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	D1	D2	D3	D4
Lectures	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☒	☐	☐
Group workshops discussion	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐
Assignments	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Writing reports	☐	☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐

Assessment Methods-ILOs

Learning Methods	Knowledge and understanding					Intellectual Skills					General and Transferable Skills		
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	D1	D2	D3
Written Examination	√	√	√	√	√	√	√	√	√	√			

Course coordinator:

Head of Department:

Course Title	**Sedimentary Petrology**	
Course Code	**1415**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Abdel-Moneem Tawfeq**	
Other Staff		
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. Geology**	
Course Delivery	**Lecture**	**28 x 2h. Lecture**
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

This course aims to enable students to deeply understand and acquire the broad knowledge principally in the diagenetic processes affecting the silicclastic and carbonate rocks.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. Physical and chemical alterations of rocks.
A2. The main diagentic processes in silicclastic rocks.
A3. diagenesis in both marine and non-marine carbonate rocks.

B. Intellectual skills:

They will also acquire the ability to*:*

B1. differentiate between various diagentic criteria in silicclastic and carbonate rocks,
B2. discuss and interpret the paragenetic sequence of various diagenetic processes,
B3. Visualize the deposition environment.

D. General and transferable skills:

D1. Critical and analytical problem solving.
D2. Autonomous practice and team-working.
D3. Sharing multidisciplinary learning.

3. Contents

Lectures 1-5	Definition, diagenetic processes
Lectures 6-11	Compositional and textural changes,
Lectures 12-17	Diagenesis in silicclastic rocks,
Lectures 18-21	Diagenesis in carbonate rocks

Lectures 22-25 Meteoric diagenesis

Lectures 26-28 Marine diagenesis

Weeks **Assessment**

4. Teaching and Learning Methods

- Lectures,
- Discussion, Presentation
- Reports and term papers,
- Web searching
- Assignments.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	2nd Term Final	100%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

- Carbonate sediments and rocks under microscope (Adams & Mackenzie 1998)
- Sand and sandstone (Pettijohn, Potter and Siever, 1972, 618pp.)

Recommended Books:

- Moore C. H (1989) Carbonate diagenesis and porosity Elsevier Science B.V. 317 p
- Adams A.E., Mackenzie W.S., and Guilford C. (1984) Atlas of sedimentary rocks under microscope (Adams, Mackenzie, and Guilford, 1984) 112 p

Periodicals and Web sites

- Journal of sedimentary rocks
- Journal of Carbonates and evaporates
- Journal of Sedimentology

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computer Presentations and Writing Boards
- Library

	Course Coordinator	Head of Department
Name	Prof. Abdel-Moneem Tawfeq	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د. عبدالمنعم توفيق عبدالحميد	أ. د. عبدالفتاح على زلط
Signature	……………………………………..	……………………………………….
Date	9/2014	9/2014

Course Contents – Course ILOs Matrix

Contents	Knowledge and Understanding			Intellectual			Transferable		
	A1	A2	A3	B1	B2	B3	D1	D2	D3
Definition, diagenetic processes	☒	☐	☐	☐	☐	☐	☐	☐	☒
Compositional and textural changes	☒	☐	☐	☐	☒	☐	☒	☒	☒
Diagenesis in silicclastic rocks	☐	☒	☐	☒	☒	☒	☒	☒	☒
Diagenesis in carbonate rocks	☐	☐	☒	☒	☒	☒	☒	☒	☒
Meteoric diagenesis	☐	☐	☒	☐	☐	☒	☒	☒	☒
Marine diagenesis	☐	☐	☒	☐	☐	☒	☒	☒	☒

Learning and Teaching Methods-ILOs

Learning and Teaching Methods	Knowledge and Understanding			Intellectual			Transferable		
	A1	A2	A3	B1	B2	B3	D1	D2	D3
Lectures	☒	☒	☒	☐	☐	☐	☐	☐	☐
Discussion, Presentation	☐	☐	☐	☒	☒	☒	☒	☒	☒
Reports and term papers	☒	☒	☒	☒	☒	☒	☒	☒	☒
Web searching	☒	☒	☒	☒	☒	☒	☐	☐	☒
Assignments.	☐	☒	☒	☒	☒	☒	☒	☒	☒

Assessment Methods-ILOs

Assessment Methods	ILOs					
	Knowledge and Understanding			Intellectual		
	A1	A2	A3	B1	B2	B3
Written exam	☒	☒	☒	☒	☒	☒

Course Title	Industrial and Radioactive Minerals	
Course Code	**1416**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Samir M. Aly**	
Other Staff	**Prof. Ibrahim A. Salem**	
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. Geology**	
Course Delivery	**Lecture**	**28 x 2h. Lectures**
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

This Course consists of two parts. The first part aims to enable students to acquire knowledge and understanding of classification, applications of industrial minerals either as raw materials or as additives. **The second part aims to** acquire knowledge and understanding of geochemistry, mineralogy, origin, occurrences in Egypt and applications of radioactive mineral deposits.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of:

A1. Classification and specifications of industrial minerals,

A2. Importance and uses of industrial minerals,

A3. Geochemical and mineralogical compositions radioactive deposits,

A4. Origin of radioactive mineral deposits.

A5. Occurrences of radioactive mineral deposits in Egypt

A6. Applications of radioactive mineral deposits.

B. Intellectual skills:

They will also acquire the ability to:

B1. Estimate the applications of industrial minerals,

B2. Compare between industrial minerals respecting their importance and uses,

B3. Asses the mineralogical and geochemical compositions of radioactive deposits for interpreting their origins.

D. General and transferable skills:

D1. Employ communication technologies to write, plot and present information.

D2. Appreciate the values of self-learning and creative thinking

D3. Acquire the skills of working in groups according to responsibilities of each member.

2. Contents

Part -1	**Industrial minerals** (An hour/week)
Lecturer 1	Introduction
Lecturers 2-8	Industrial minerals
Lecturers 9-14	Physical and chemical specifications of industrial minerals
Lecturers 15-28	Industrial applications as raw materials or as additives.
Part -2	**Radioactive minerals** (An hour/week)
Lecturers 1-3	Radioactive mineral deposits
Lecturers 4-8	Geochemistry of radioactive mineral deposits
Lecturers 9-13	Mineralogy of radioactive mineral deposits
Lecturers 14-18	origin of radioactive mineral deposits
Lecturers 19-23	Classification and occurrence of radioactive mineral deposits in Egypt
Lecturers 24-28	Applications of radioactive mineral deposits (energy, medical, research, industry, some common radioactive isotopes and their uses

4. Teaching and Learning Methods

- Lectures
- Discussions
- Term paper and reports
- Web searching
- Assignments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		100%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

Chang L.L. Y. 2002. Industrial Mineralogy: Materials, Processes, and Uses. Prentice Hall, 472p.

- Studies of minerals deposits (Smirnov et al., 1985)

Recommended Books:

-Prasad,U, (2006) : Economic Geology 2nd ed. CBS publisher and distrib.
- Manning, D.A. (1995): Introduction to industrial minerals. Chapman and Hall, 276 p.

Periodicals, Web sites.

- Mineralogical Magazine

- Journal of Industrial Minerals.

- Journal of Economic Geology.

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.

	Course Coordinator	Head of Department
Name	Prof. Samir M. Aly	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د. سمير محمد علي	أ. د. عبدالفتاح على زلط
Signature	………………………………… .	…………………………………
Date	9/2014	9/2014

Course Contents – Course ILOs Matrix

Contents	Course outcomes ILOs											
	Knowledge and Understanding						Intellectual			Transferable		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	D1	D2	D3
Part -1 Industrial minerals												
Introduction	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Industrial minerals	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒
Physical and chemical specifications of industrial minerals	☒	☐	☐	☐	☐	☐	☒	☐	☐	☒	☒	☒
Industrial applications	☐	☒	☐	☐	☐	☐	☒	☒	☐	☒	☒	☒
Part -2 Radioactive minerals												
Radioactive mineral deposits	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
Geochemistry of radioactive mineral deposits	☐	☐	☒	☐	☐	☐	☐	☐	☒	☒	☒	☒
Mineralogy of radioactive mineral deposits	☐	☐	☒	☐	☐	☐	☐	☐	☒	☒	☒	☒
origin of radioactive mineral deposits	☐	☐	☐	☒	☐	☐	☐	☐	☒	☐	☒	☒
classification and occurrence of radioactive mineral deposits in Egypt	☐	☐	☐	☐	☒	☐	☐	☐	☐	☒	☒	☒
Applications of radioactive mineral deposits	☐	☐	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒

Learning and Teaching Methods-ILOs

Learning and Teaching Methods	Course outcomes ILOs											
	Knowledge and Understanding						Intellectual			Transferable		
	A1	A2	A3	A4	A5	A6	B1	B2	B3	D1	D2	D3
Lectures	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
Discussions	☐	☐	☐	☒	☐	☐	☒	☒	☒	☐	☒	☒
Term paper and reports	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
Web searching	☒	☒	☒	☒	☒	☒	☐	☒	☐	☐	☒	☒
Assignments	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒	☒	☒

Assessment Methods-ILOs

Assessment Methods	Course outcomes ILOs								
	Knowledge and Understanding						Intellectual		
	A1	A2	A3	A4	A5	A6	B1	B2	B3
Written exam	☒	☒	☒	☒	☒	☒	☒	☒	☒

Course Title	**Statistics**	
Course Code	**1638**	
Academic Year	**2014/2015**	
Coordinator	**Dr. Mohamed M. Abd El Monsef**	
Other staff		
Level	**Graduate-M. Sc.**	
Semester	**Semesters**	
Pre-Requisite	**B. Sc. Geology**	
Course delivery	**Lecture**	**28 x 1h lectures**
	Practical	**-**
Parent Department	**Mathematics Department**	
Date of Approval	**September, 2014**	

1. Aims

This module aims to provide M. Sc. students in geology with basic concepts of study design and data analysis suitable for laboratory and field research, and to help students to develop the skills needed to apply statistical methods using related statistical software; e.g. Primer or GraphPad in scientific geological research. Emphasis will be on practical and applied skills using example of relevance to geology students.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

- A1. Statistical issues such as statistical measures for data description; statistical estimation; correlations and testing hypothesis.
- A2. Study design.
- A3. Types of variables that are used in geological research.
- A4. Role of sampling variation, how to quantify the variability, and its role in comparing groups or categories.

B. Intellectual skills:

- B1. Carry out confidently simple essential statistical methods in geological research and to interpret results.
- B2. Select appropriate statistical methods for analysis of simple data sets and apply them on a computer using geo-statistical software, GraphPad.
- B3. Summaries data using graphical and tabular data.
- B4. Interpret research findings and explain them in a clear, concise and logical manner.

D. Transferable skills

- D1. Write report including graphical material.

D2. Present and discuss the finding from statistical analysis in a clear, concise and logical manner.

D3. Use internet and other electronic sources as a source of information.

3. Contents

Analysis and design of research studies (1 hours/week)

Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.
Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.
Lectures 27-28	Design of experiments: The null hypothesis, statistical significance and rejecting the null hypothesis.
Lectures 29-30	Revision
Weeks 31, 32	**Assessment**

4. Teaching and Learning Methods

- Lectures are an integral part of course delivery in this course, supported by problems classes, tutorial groups, computational work, office hours, and individual tutorials.
- Students engage in private study in which they work through set problem sheets and individual assignments as well as assimilating lecture content.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 29th Week	100%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential books

- Glantz, Stanton A. (2005): Primer of Biostatistics, 6th Edition McGraw-Hill.

Recommended books

- Samuels, M. L. (1989): Statistics for the Life Sciences. Dellen Publishing Company, USA.
- Rosner, B. (1990): Fundamentals of Biostatistics. PWS-Kent Publishing Company, USA.

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computers Presentations and Writing Boards
- Primer or GraphPad biostatistics software.

	Course Coordinator	Head of Department
Name	Prof. Mohamed Abd Elmonsef	Prof. Kadry Zakaria Elsherbeny
Name (Arabic)	أ. د. محمد عبد المنصف	أ. د. قدرى زكريا الشربينى
Signature	…………………………………..	……………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	Programme outcomes ILOs										
	Knowledge and Understanding				Intellectual				Transferable		
	A1	A2	A3	A4	B1	B2	B3	B4	D1	D2	D3
Introduction	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☐
Summarizing data	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐
Sampling variability of a mean	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐
Analysis of quantitative data	☒	☐	☐	☐	☒	☒	☒	☒	☒	☐	☐
ANOVA	☒	☐	☐	☐	☒	☒	☐	☒	☒	☒	☐
Sampling variability of proportions	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☐
Analysis of categorical data	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☐
Regression and correlation	☒	☒	☒	☒	☐	☐	☒	☒	☐	☒	☒
Comparing correlations	☒	☒	☒	☐	☐	☐	☒	☒	☐	☒	☒
Regression and correlation	☒	☒	☒	☐	☐	☐	☒	☒	☐	☒	☒
Comparing distribution	☒	☒	☒	☐	☒	☒	☒	☒	☐	☒	☒
Comparing means	☒	☒	☒	☐	☒	☒	☒	☒	☐	☒	☐
Comparing variances	☒	☒	☒	☐	☐	☐	☐	☐	☐	☒	☒
Design of experiments	☒	☒	☒	☒	☐	☐	☐	☐	☐	☒	☒

Learning and Teaching Methods-ILOs

Learning and Teaching Methods	Course outcomes ILOs										
	Knowledge and Understanding				Intellectual				Transferable		
	A1	A2	A3	A4	B1	B2	B3	B4	D1	D2	D3
Lectures	X	X	X		X	X	X		X	X	
private study				X				X			X

Assessment Methods-ILOs

Assessment Methods	Course outcomes ILOs											
	Knowledge and Understanding					Intellectual				Transferable		
	A1	A2	A3	A4		B1	B2	B3	B4	D1	D2	D3
Written Examination	X	X	X	X		X	X					

Course Title	Computer	
Course Code	**1419**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Mohamed El-Awady**	
Other Staff	**Prof. Mahmoud Kamel, Prof. Qadry Zakaria**	
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc.**	
Course Delivery	**Lecture**	**28 x 1h lectures**
	Practical	**28 x 1h practicals**
Parent Department	**Computer Centre**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to acquire a range of transferable skills that are important for post graduate M. Sc. students to:

4) Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.
5) Underpin academic work throughout postgraduate studies.
6) Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

A. Knowledge and understanding:

Upon successful completion of this course the students should be able to:

A1. Define knowledge and understanding of the use of IT in the context of their postgraduate studies.
A2. Explain the diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.
A3. Carry out necessary graphical, statistical and frequency analyses of different types of data.
A4. Create powerful presentation using sophisticated software packages and make use of different internet resources.
A5. Solve scientific problems using computer programming and make use of different photo enhancing and manipulation techniques.

B. Intellectual skills:

They should also acquire the ability to:

B2. Write different application programs to develop effective information analysis and presentation.

C. Professional and practical skills:

C1. Write a number of computer packages to present information.

D. General and transferable skills:

D1. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Lectures 1-2	Methods for graphical representations, Data analysis and Data modeling
Lectures 3-4	**Assignment 1** : **Using Application programs** Calculation of Slope and intersection of lines , Best fitting for data, Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)
Lectures 5-6	Statistical Data analysis
Lectures 7-9	**Assignment 2** : **Using Application programs** Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data
Lectures 10-11	Creating powerful presentation including charts, images, video, etc and different attractive animations
Lectures 12-14	**Assignment 3** : **Using PowerPoint program** Design a real and powerful presentation with different acquired skills
Lectures 15-17	Use of internet capabilities and searching engines **Assignment 4: Using the Internet** Life search on the internet for some real information
Lectures 18-20	Creating Data Base and related Queries and Reports **Assignment 5: Using Application programs** Creating a real Data Base and apply different queries and reports to extract useful information
Lectures 21-23	Computer programming language **Assignment 6**: Programming using Visual Basic 6 Solving real problems using a computer language
Lectures 24-26	Photo manipulation and enhancement using the photoshop **Assignment 7**: **Using the Photoshop program** Practicing on manipulation and enhancing of images
Lectures 27-28	Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities
Weeks 29-30	**Assessment**

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Assignments

The course is delivered through lectures, practical sessions and assignments. Team working skills are developed on a week-long laboratory exercises and the students present and defend their findings in a public seminar.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

Course Coordinator		Head of Department
Name	Prof. Mohamed M. El-Awady	Prof. El-Said Taha Rizk
Name (Arabic)	أ.د. محمد محمد العوضي	أ.د. السيد طه رزق
Signature	………………………	…………………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Contents	Knowledge and Understanding							Practical	Transferable	
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Methods for graphical representations	☒	☒	☐	☐	☐	☐	☐	☒	☒	☐
Statistical Data analysis	☒	☒	☐	☐	☐	☐	☐	☒	☒	☐
Creating powerful presentation	☒	☒	☒	☒	☐	☐	☐	☒	☒	☐
Use of internet capabilities and searching engines	☒	☒	☐	☒	☒	☐	☐	☒	☒	☐
Creating Data Base	☒	☒	☒	☐	☐	☐	☐	☒	☒	☒
Computer programming language	☒	☒	☒	☐	☐	☒	☐	☒	☒	☒
Photo manipulation	☒	☒	☐	☒	☐	☐	☒	☐	☒	☒
Introduction to Data frequency analysis	☒	☒	☐	☒	☐	☒	☐	☐	☒	☒

Learning and Teaching Methods-ILOs

Learning and Teaching Methods	Knowledge and Understanding							Intellectual skills	Practical	Transferable
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Lectures	X	X	X	X	X		X			
Practical classes								X	X	X
Assignments						X				X

Assessment Methods-ILOs

Contents	Knowledge and Understanding							Intellectual skills	Practical	Transferable
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Written	X	X	X	X	X		X			
Practical Examination								X	X	X
Semester work						X		X		X

Course Title	**Essay and Research**	
Course Code	**24096**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Abdel Fattah A. Zalat**	
Other Staff	**All Geology Staff**	
Level	**Graduate-M. Sc.**	
Semester	**Two Semesters**	
Pre-Requisite		
Course Delivery	**Tutorial**	**Tutorial setting with the supervisor: 14 x 2h**
		At least once every 2 weeks
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

By the end of this course, students will be able to:

1) Develop geologic approaches that meet community needs considering economic, environmental, social, ethical, and safety requirements.
2) apply geologic facts and theories to analyze and interpret practical geologic data
3) Collect, analyze, and present data using appropriate format and techniques.
4) Postulate concepts and choose appropriate solutions to solve problems on scientific basis.
5) Use effectively information technology and the software packages relevant to the geological problems.
6) Adopt self and long life-learning and participate effectively in research activities.

2. Intended Learning Outcomes

A. Knowledge and understanding:

Upon successful completion of this course the students should acquire knowledge and an understanding of:

A1) theoretical bases, procedures and techniques used for geological field studies and related laboratory analysis.

B. Intellectual skills:

They will also acquire the ability to:

B1. Develop the capability of interpretation and analysis of geologic data.
B2. Assume a range of ideas to solve different geological problems.
B3. recognize and differentiate between the published geological data

C. Professional and practical skills:

C1. Apply scientific ethics for accuracy during reporting.

C2. Employ the geologic bases to meet community needs.

C3. Investigate previous work and references.

D. General and transferable skills:

D1. Use information and communication technology effectively.

D2. Identify roles and responsibilities, and their performing manner.

D3. consider community linked problems

D4. Acquire self-and long life-learning.

D5. Apply scientific models and systems effectively.

D6. Deal with scientific patents considering property right.

3. Contents

This module is given over two semesters with no fixed programme. It will give students the opportunity to develop their written communication skills by being given practice at obtaining information from a variety of sources, organizing and presenting it as a cogent argument.

4. Teaching and Learning Methods

- **Small group tutorials** (1 member of staff to 1-5 students, usually following the same or related programs). 4 sessions per semester. Students tutored by different staff members in the two semesters to ensure diversity of styles and experiences. Required to write an assessed essay over the 2 semesters and to undertake preparatory work as required by the tutor.
- Students are encouraged to devote private study time to reading from a collection of general texts held in the library and to be aware of current developments via the popular scientific press.
- **Supervision**: The level of contact between students and supervisors during project work will vary across the different disciplines in the Faculty but all students are required to maintain regular contact with the supervisor. This is the student responsibility. Student should note that they are required to meet with the supervisor at least once every two weeks during the semesters to discuss progress. Student may, of course, make an appointment to see his supervisor at any time. Students who fail to make regular contact with the Supervisor will be reported to the Coordinator of Teaching. Students should remember, the supervisor is also his personal tutor with whom he should raise any issues of concern which may be affecting his work.

5. Student Assessment

There are three parts to the assessment of the project:

1. Essay Structure: 5000 words (50% awarded by supervisor and second assessor): Project report in the style of a scientific paper and supervisors mark, reflecting student effort, commitment and input to project plus team-working skills where appropriate.
2. Student conducts (20% awarded by supervisor): Student portfolio on the review of the literature pertinent to project area.
3. Seminar (30% awarded by supervisor and second assessor): oral presentation to peers and academic staff.

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Oral Assessment	KU, I	Assessment Session	Term Final	30%
Student portfolio	KU, I	Continuous Assessment		50%
Seminar	P, T	Assessment Session	Term Final	20%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

- Initially, students are provided with a limited number of references relating to their subject area, but then are expected to search the literature on their own.

Recommended Books:

- Day R. A. 1986: How to write and publish a scientific paper. Cambridge University Press, Fourth Edition.

- Master, PA. 1986: Science, Medicine and Technology: English grammer and technical writing. Prentice-0Hall, Inc., Engllewood Cliffs, New Jersey 07632.

Web sites:

- www.thomsonrights.com

7. Facilities required for teaching and learning

- Library

- Web Searching

	Course Coordinator	Head of Department
Name	Prof. Abdel Fattah A. Zalat	Prof. Abdel Fattah A. Zalat
Name (Arabic)	أ. د. عبد الفتاح علي زلط	أ. د. عبد الفتاح علي زلط
Signature		
Date	/9/2014	/9/2014

M.Sc. Programme

of

Paleontology & Stratigraphy

A. Programme Specification

rogramme Title	**Master of Paleontology and Stratigraphy**
Award	**Master of Paleontology and Stratigraphy**
Parent Department	**Geology Department**
Teaching Institution	**Faculty of Science - TU**
Awarding Institution	**Tanta University**
Coordinator	**Prof. Mahmoud F. Mohamed**
External Evaluator(s)	**Prof. Salah N. Ayad, professor of geology, Faculty of Science, Mansura University**
QAA Benchmarking Standards	**Academic Reference Standards (ARS)**
Other Reference Points	
Date of intake	**Every year in September**
Review Date	**Internal Periodic Review, Summer 2014**
Date of Approval	**September, 2014**

1. Aims

1) To provide a deep theoretical background in the soft rocks and their economic materials.
2) To offer an understanding of how they can be applied in a laboratory management context, development of the natural resources and protection environment.
3) To motivate in graduates the culture of lifelong learning and continuing professional development and an appreciation of the value of science to society.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A4. biota of the earth through time; including the essential fauna occupied the land, systematic, morphology, development, evolution, ecology, stratigraphic range and geological significance of different phyla (palaeo).

A5. Stratigraphic laws, classifications and correlation the rock units (chronostratigraphy and geochronology) and sequence stratigraphy.

A6. Types of sediments and sedimentary rocks, and know the common sedimentary structures and their origin, and different types of sedimentary environments.

A7. Natural resources in soft rocks as; oil, gas, water ….etc.

A8. Scientific research, ethical characters of the work and the important scientific awareness.

B. Intellectual skills:

They will also acquire the ability to:

B9. Apply subject knowledge and understanding soft rocks to address familiar and unfamiliar problems related to earth history.

B10. Formulate a hypothesis, plan and execute laboratory investigation or development work, evaluate the outcomes and draw valid conclusions.

B11. Construct reasoned arguments to support a position on the ethical and social impact of scientific advances and appreciate the existence of different points of view.

B12. Integrate theoretically and practically.

C. Professional and practical skills:

C10. Record, collate, analyse and report data of laboratory and field investigations.

C11. Undertake laboratory and field investigations in a liable, safe and ethical manner.

C12. Plan and conduct various forms of laboratory and field investigations in specific, precise and accurate manner.

D. General and transferable skills:

D14. Communicate about a subject clearly, confidently and effectively using a range of presentational techniques.

D15. Apply numerical and IT skills with confidence and accuracy.

D16. Work both independently and in collaboration with others.

D17. Take responsibility for self-managed learning and personal/professional development.

3. Academic standards

3.A External references for standards (Benchmarks):

Academic Reference Standards (ARS)

3.B Comparison of provision to external references:

Academic Reference Standards(ARS).

3. Academic Reference Srandards:

The Academic Reference Standards for the program of the M.SC. degree in Paleontology and Stratigraphy as well as the attributes and capabilities of the graduates were based essentially on the **General Academic Reference Standards (ARS) of graduate studies** published by the National Authority for Quality Assurance and Accreditation of Education (NAQAAE 2009). The following Specific Academic Standards for the Master Degree in Paleontology and Stratigraphy are adopted and were approved by the Faculty Council in 20/11/2012

Specific Academic Reference Standards

3.1 Graduate Attributes

The postgraduates of M.Sc. in Paleontology and Stratigraphy must have been prepared for:

1.1 Systematic understanding and critical awareness of topics in the area of paleontology and stratigraphy.

1.2 Problems of routine nature, which are generally adequately solved.

1.3 Generic skills, which are appropriately developed by professional practices.

1.4 Advanced studies in the area of paleontology and stratigraphy to support research work.

1.5 Information gathering, evaluation of published information, critical analysis of data.

1.6 Field and experimental work is carried out independently in a reliable and efficient manner.

3.2. Knowledge and Understanding

By the end of the M.Sc. program, the postgraduate students must be able to acquire knowledge and understanding of:

2.2 In-depth knowledge of the core themes of paleontology and stratigraphy.
2.2 Different important procedures and techniques used in the field of paleontology and stratigraphy analyses.

2.3 The ethics and bases of scientific research in general and that of the paleontology and stratigraphy research in particular.

2.4 Theories of paleontology and stratigraphy sciences and broaden his/her scope of theories of other interdisciplinary fields.

3.3. Intellectual Skills

By the end of the M.Sc. program, the postgraduate students must be able to:

3.1- Use the knowledge of the paleontology and stratigraphy.

3.2- Differentiate geophysical problem-solving procedures and techniques.

3.3- Identify and analyze problems critically, set priorities and make professional decisions.

3.4- Develop a scientific technical planning based on sufficient paleontology and stratigraphy field observations.

3.5- Test and analyze hypotheses in the field of paleontology and stratigraphy and deal with relevant to problems.

3.4. Practical and Professional Skills

By the end of the M.Sc. program, the postgraduate students must be able to:

4.1- Digest, critically evaluate and present paleontology and stratigraphy research.

4.2- Appreciate kinds of data limitation and accuracy.

4.3- Write professional reports efficiently.

4.4- Create plans to maximize the quality of the paleontology and stratigraphy analytical performance.

4.5- Evaluate resources of data in paleontology and stratigraphy research and renovate them.

3.5. General and Transferable Skills

By the end of the M.Sc. program, the postgraduate students must be able to:

5.1- Attain an independent learning technique for a lifetime, professional career development in the field of paleontology and stratigraphy.

5.2- Work out paleontologically and stratigraphyically-based initiative plans and deal with stress and time management.

5.3- Communicate verbally and exchange the results and information successfully.

5.4- Use information and communication technology.

4. Curriculum Structure and contents:

4.A Programme duration One Year

4.B Programme structure

4.B.1	Number of contact hours	per Week:						
	First term:	Lectures	14	Lab.	1	Total	14
	Second term:	Lectures	14	Lab.	1	Total	14
	Overall Contact hours	Lectures	28	Lab.		Total	28
4.B.2	Number of contact hours	Compulsory	28	Optional	None	Optional	None
4.B.3	Number of credit hours of specialized courses			No.	-	%	100

4.B.4 Number of contact hours of courses of social sciences and humanities: No. - % -

4.B.5 Number of credit hours of other courses: No. - % -

5. Programme courses

Year 1	Course Title	Lec.	Prac.	Exer.	Program ILOs Covered
Code	Three of the first six courses are obligatory	Hours			
1421	Paleontology	2	-	-	
1422	Stratigraphy	2	-	-	
1423	Geotectonics	2	-	-	
1424	Field Geology	2	-	-	
1425	Sedimentation and Correlation	2	-	-	
1426	Petroleum Geology and Hydrogeology	2	-	-	
1427	Essay	2	-		
1428	Statistics	1	-	-	
1429	Computer	1	1	-	

6. Programme admission requirements

The applicants must have obtained a Bachelor’s degree, or its equivalent, in Geology with a “good” degree as a minimum for approval.

7. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression:

- The programme includes one year of coursework, followed by a research project, i.e. the Master thesis, by laboratory investigation in a mentored environment.
- Assessment is held by the end of the first year, and student will be eligible only on attaining a “pass” degree (60%).
- The student who fails certain course at the first attempt will be eligible for only a “Pass” degree following only one re-set examination.
- The student can submit his thesis only after one year from the date of the Faculty Council approval on the thesis subject.

8. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Not applied yet	
2. Alumni	Not applied yet	
3. Stakeholders (Employers)	Not applied yet	
4. External Evaluator(s) (External Examiner(s))	Prof. Salah N. Ayad	

Thesis

The thesis of M.Sc. in Paleontology and Stratigraphy is a formal written document representing sustained research contributes to the accumulated understanding of the Paleontology and Stratigraphy field. Throughout the preparation of the thesis student demonstrate in-depth, specialist knowledge and sophisticated understanding of concepts, information and techniques at the forefront of the discipline; exhibit mastery in the exercise of intellectual abilities including theoretical and practical skills; take a proactive and self-reflective role in working and to develop professional relationships with others; proactively formulate ideas and hypotheses; evaluate current issues; develop, implement and execute plans meeting deadlines and to employ IT and library resources appropriately

Responsibility for different phases in the preparation and checking of a graduate thesis rests jointly with the student, the members of supervision committee and the graduate office. The supervision committee may control of the following:

1. Thesis divisions and their order
2. Terminology for the division
3. The arrangement of reference material.

A graduate thesis is a permanent evidence of contribution made by students in particular field of knowledge and should reflect credit on the University as well as on the students. Student has a duty to present findings not only with precision, but also intelligently and attractively.
A thesis must include all the significant results obtained and must disclose all the methods and processes employed in research in such a detail that the work may be repeated by anyone skilled in the field. The student should be scrupulously careful to give references to all the work on which the thesis depends directly or significantly. Good usage requires documentation of statements whenever possible by reference to published and unpublished.

The thesis should contain the following:

- Title page (title, name of student, university, faculty, name of program, date, supervisors)
- Table of contents
- Introduction, containing a definition of the thesis statement and the aim.
- Literature review.
- Materials and methods.
- Results.
- Discussion and conclusions.
- References.

Language of the thesis:

- The thesis is written in English accompanied by a summary in Arabic.

One accepted paper is required

- Before the thesis can be presented for granting the M.Sc. degree, at least one accepted paper is required

Apply the thesis to the Department Council

- With the approval of the thesis by the supervision committee, the student can apply the thesis to the Department Council.

Examiners Committee

- The examiners committee is selected by Geology Department Council. The M.Sc. Degree is awarded to the applicant by Tanta University Council, upon the recommendation of the department and the Faculty Council.

We certify that all of the information required to deliver this programme is contained in the above specification and will be implemented. All course specifications for this program are in place.

We certify that all of the information required to deliver this programme is contained in the above specification and will be implemented. All course specifications for this program are in place.

Name	Signature	Date
Programme Coordinator: Prof. Abdelfattah Ali Zalat أ. د. عبدالفتاح على زلط	……..……..……….………..	/9/2014
Head of Quality Assurance Unit: Prof. Hoda Kamal El-Sayied أ.د. هدى كمال السيد	……..……..……….………..	/9/2014
Dean of the Faculty: Prof. Tarek Abd elmoniem Fayed أ.د. طارق عبد المنعم فايد	……..……..……….………..	/9/2014

Programme Contents – Programme ILOs Matrix

Courses	Programme outcomes ILOs															
	Knowledge and Understanding					Intellectual				Practical			Transferable			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
1421 Paleontology	☒	☒	☐	☐	☐	☒	☐	☒	☐	☒	☒	☐	☒	☒	☐	☐
1422 Stratigraphy	☐	☒	☐	☐	☐	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐
1423 Geotectonics	☐	☐	☒	☐	☐	☒	☒	☒	☐	☒	☐	☒	☐	☒	☒	☒
1424 Field Geology	☐	☒	☒	☐	☐	☒	☒	☒	☐	☐	☒	☒	☐	☒	☒	☒
1425 Sedimentation and Correlation	☐	☐	☒	☐	☐	☒	☒	☐	☐	☐	☒	☐	☐	☒	☒	☐
1426 Petroleum Geology and Hydrogeology	☐	☐	☐	☒	☐	☐	☒	☒	☐	☐	☒	☐	☐	☒	☐	☐
1427 Essay	☐	☐	☐	☐	☒	☐	☐	☒	☒	☐	☐	☒	☐	☐	☒	☒
1428 Statistics	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☒	☒	☒	☒	☒
1429 Computer	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☒	☐	☒	☒	☒

Course Title	Paleontology	
Course Code	**1421**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Mahmoud F. Mohamed**	
Other Staff	**Prof. Abdelfattah A. Zalat**	
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. Geology**	
Course Delivery	**Lecture**	**28 x 2h lectures**
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

This module is in two halves.

1) The first half aims to gain knowledge of the classification scheme of the animals, international nomenclature code of biota, the essential fauna lived on the earth through time, and their development, evolution, ecology, stratigraphic range and geological significance.
2) The second half aims to understand applied micropaleontology as well as the value of foraminifera, calcareous nannoplankton, ostracods, pollen and spores in oil exploration.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. main fauna occupied the earth through time and their development.
A2. index fossils of the different geological periods, and the scientific methods for collecting and separating taxa in the field and laboratory.
A3. paleoenvironment and paleoecology prevailed in the earth through geological times.

B. *Intellectual skills:*

They should also acquire the ability to:

B1. Discriminate between different fossils (faunas & floras)

B2. How to think and interpret biostratigraphical problems

B3. Solve a complicated biostratigraphical problem in a good manner by using more than one tool.

an area.

D. General and transferable skills:

They should also acquire the ability to:

D1. Make scientific communications and discussions with other paleontologists.

D2. Use IT in proper way.

D3. Work independently and in a team.

3. Contents

Part - 1	**Paleontology (Macropaleontology)** (An hour / week)
Lectures 1-4	Geological significance of Phylum Porifera
Lectures 5-7	Geological significance of Phylum Cnidaria
Lectures 8-10	Geological significance of Phylum Arthropoda, class Trilobite
Lectures 11-13	Geological significance of Phylum Mollusca
Lectures 14-17	Geological significance of Phylum Brachiopoda
Lectures 18-21	Geological significance of Phylum: Echinodermata
Lectures 22-24	Geological significance of Phylum Hemichordata, class Graptolithina
Lecture 25-28	Paleoecology & paleoenvironment
Part - 2	**Paleontology (Micropaleontology)** (An hour / week)
Lectures 1-3	Classification and Stratigraphic importance of foraminifera
Lectures 4-7	Paleoecology of foraminifera
	Calcareous nannoplankton
Lectures 16-20	Ostracoda
Lectures 21-28	Diatoms
Lectures 25-28	Pollens and spores

Weeks 29,30 **Assessment**

4. Teaching and Learning Methods

- Lectures
- Internet and library search
- Writing Reports
- Field Trips
- Assessments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 30th Week	100%

*KU: Knowledge and Understanding, I: Intellectual

6. List of references

Essential Books:

- Clarkson E. Invertebrate paleontology and evolution. Blackwell Science, Oxford 1998**. (**For Paleontology Course)
- Haq B. and Boersma A. (1978): Introduction to marine micropaleontology.. (For Micropaleontology Course**)**

Recommended Books:

- Doyle P. Understanding fossils; an introduction to invertebrate paleontology. Wiley, Chichester, UK 1996. (For Paleontology Course)
- Benton M. & Harper D. Basic paleontology. Addison Wesley, Longman 1997. (For Paleontology Course)
- Milsom C. & Rigby S. Fossils at a glance. Blackwell 2005. (For Paleontology Course)
- Braiser, D. & Boersma, M. (1980): Microfossils. (For Micropaleontology Course)
- Raup, D. and Stanley, S. (1975): Principles of paleontology. (Paleontology Course)
- Haynes, J. (1981): Foraminifera. (For Micropaleontology Course)

Periodicals, Web sites:

- Journal of Paleontology
- Palaeontology

- Journal of Micropaleontology

- http://www.nhm.ac.uk

- http://www.usgs.gov/

7. Facilities required for teaching and learning

- Video Projectors

- Computer Presentations and Writing Boards

- Binocular Microscope,

- Hand specimens

- Field trips

- Library

	Course Coordinator	**Head of Department**
Name	Prof. Mahmoud F. Mohamed	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د. محمود فارس محمد	أ. د. عبدالفتاح على زلط
Signature	……………………..	……………………….
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	Programme outcomes ILOs								
	Knowledge and Understanding			Intellectual			Transferable		
	A1	A2	A3	B1	B2	B3	D1	D2	D3
Part – 1 Paleontology (Macropaleontology)									
Geological significance of Phylum Porifera	☒	☒	☐	☒	☐	☐	☒	☒	☐
Geological significance of Phylum Cnidaria	☒	☒	☐	☒	☒	☐	☐	☒	☐
Geological significance of Phylum Arthropoda	☒	☒	☐	☒	☒	☐	☐	☒	☐
Geological significance of Phylum Mollusca	☒	☒	☐	☒	☒	☐	☐	☒	☐
Geological significance of Phylum Brachiopoda	☒	☒	☐	☒	☒	☐	☐	☒	☐
Geological significance of Phylum: Echinodermata	☒	☒	☐	☒	☒	☐	☐	☒	☐
Geological significance of Phylum Hemichordata	☒	☒	☐	☒	☐	☐	☐	☐	☐
Paleoecology & paleoenvironment	☐	☐	☒	☐	☐	☒	☒	☒	☒
Part - 2 Paleontology (Micropaleontology)									
Classification and Stratigraphic importance of foraminifera	☒	☒	☐	☒	☒	☐	☐	☐	☒
Paleoecology of foraminifera Calcareous nannoplankton	☒	☒	☒	☒	☐	☒	☐	☐	☐
Ostracoda	☒	☒	☐	☒	☐	☐	☐	☐	☐
Diatoms	☒	☒	☐	☒	☐	☐	☐	☐	☒
Pollens and spores	☒	☒	☐	☒	☐	☐	☐	☐	☒

Learning and Teaching Methods-ILOs

Courses	Programme outcomes ILOs									
	Knowledge and Understanding			Intellectual			Transferable			
	A1	A2	A3	B1	B2	B3	D1	D2	D3	
Lectures	X	X	X							
Internet and library search			X			X		X		
Writing Reports		X			X	X				
Field Trips				X						X
Assignments				X	X	X			X	

Assessment Methods-ILOs

Courses	Programme outcomes ILOs											
	Knowledge and Understanding					Intellectual				Transferable		
	A1	A2	A3			B1	B2	B3		D1	D2	D3
Written Examination	X	X	X			X	X					

Course Title	Stratigraphy	
Course Code	**1422**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Abdelfattah A. Zalat**	
Other Staff	**Dr. Hamza M. Khalil**	
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. in Geology**	
Course Delivery	**Lecture**	**28 x 2h lectures**
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

By the end of this course, students will be able:

1) to gain knowledge about the basic principles of stratigraphy and its application in the exploration of mineral resources and oil investigation.

2) to determine the relative age of the rocks and their relationships.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

- A1. stratigraphic subdivisions and units.
- A2. stratigraphic laws, sequence stratigraphy, chronostratigraphy and geochronology.
- A3. geological events and development the area of study and their application in oil and ores explorations.

.***B. Intellectual skills:***

They should also acquire the ability to:

- B1. Use the available data to give reasonable interpretation of the geological history.
- B2. Predict the following events through some old events.
- B3. Try to link by recent events and its uses in interpreting the old ones.

D. General and transferable skills:

D1. Make scientific communications and discussions with other paleontologists.

D2. Use IT in proper way.

D3. Work independently and in a team.

3. Contents

Lectures 1-4	Modern revolution in stratigraphy, traditional stratigraphy and new stratigraphic methods
Lectures 5-7	Stratigraphic-sedimentological database
Lectures 8-11	Litho and biostratigraphic units
Lectures 12-15	Basin mapping methods
Lecture 16-20	Unconformities
Lecture 21-23	Stratigraphic correlations
Lecture 24-25	Allostratigraphy, cyclostratigraphy, chemostratigraphy and event stratigraphy
Lectures 26-28	Sequence stratigraphy; principals and their applications
Weeks 29, 30	**Assessment**

4. Teaching and Learning Methods

- Lectures,
- Discussions,
- Exercises and case study,
- Reports and web-researches,
- Field Trips

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 30th Week	100%

*KU: Knowledge and Understanding, I: Intellectual

6. List of references

Essential Books:

- Friedman, G. 1992: Principles of sedimentary deposition: stratigraphy and Sedimentology. Macmillan Pub. Comp., USA, 717pp.

Recommended Books:

- Catuneanu, O. 2006. Principals of sequence stratigraphy. Elsevier, 375pp.
- Coe. Sea-Level changes 2005

- Miall A. M. 1990: Basic principals of basin analysis.

Periodicals, Web sites:

- Journal of Sedimentology
- Journal of Sedimentary Research
- PALAIOS

7. Facilities required for teaching and learning

- Video Projectors
- Computer Presentations and Writing Boards
- Field trips

	Course Coordinator	Head of Department
Name	Prof. Abdelfattah A. Zalat	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د.عبد الفتاح على زلط	أ. د. عبدالفتاح على زلط
Signature	…………………………	………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	Programme outcomes ILOs								
	Knowledge and Understanding			Intellectual			Transferable		
	A1	A2	A3	B1	B2	B3	D1	D2	D3
Modern revolution in stratigraphy	☒	☐	☐	☒	☐	☒	☒	☒	☐
Stratigraphic-sedimentological database	☒	☒	☒	☒	☒	☒	☒	☐	☐
Litho and biostratigraphic units	☒	☒	☒	☒	☒	☒	☒	☐	☐
Basin mapping methods	☒	☐	☒	☒	☒	☒	☒	☐	☐
Unconformities	☒	☐	☒	☒	☒	☐	☒	☒	☐
Stratigraphic correlations	☒	☒	☐	☐	☒	☒	☒	☒	☐
Allostratigraphy	☒	☒	☐	☐	☐	☒	☐	☒	☒
Sequence stratigraphy	☒	☐	☒	☐	☐	☒	☒	☒	☒

Learning and Teaching Methods-ILOs

Courses	Programme outcomes ILOs												
	Knowledge and Understanding					Intellectual				Transferable			
	A1	A2	A3			B1	B2	B3		D1	D2		
Lectures	X	X	X										
Discussions		X				X				X			
Exercises and case study						X	X	X					
Reports and web-researches		X					X	X			X		
Field Trips			X										

Assessment Methods-ILOs

Courses	Programme outcomes ILOs												
	Knowledge and Understanding					Intellectual				Transferable			
	A1	A2	A3	A4	A5	B1	B2	B3		D1	D2	D3	D4
Written Examination	X	X	X	X	X	X							

Course Title	**Geotectonics**	
Course Code	**1423**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Mohamed Atef Noweir**	
Other Staff	**Prof. Mahmoud H. Ashmawy**	
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. in Geology**	
Course Delivery	**Lecture**	**28 x 2h. lectures**
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

By the end of this course, students will be able:

1) To provide a background for understanding the origin and significance of regional geological structures.

2) Allow the interpretation of the dynamic circumstances that give rise to deformation events.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire advanced knowledge and understanding of:

A1. Plate motion and plate boundaries.

A2. The origin of structural deformation.

A3. The relation between the plate motions and crustal deformation.

B. Intellectual skills:

They should also acquire the ability to:

B1. Use the available data to give reasonable interpretation for the deformations of the rocks.

B2. Predict the global kinematics.

B3. Demonstrate how structures and deformation may be related to large-scale earth processes.

D. General and transferable skills:

D1. Join a research-group and sharing ideas.

D2. Deliver seminars, lectures, workshops and write reports.

D3. Work in a team and independently.

3. Contents

Lectures 1, 2	Historical perspective
Lectures 3-5	Structure and composition of the Earth interior
Lectures 6-8	Subduction zones, seismic zones, island arc and volcanism
Lectures 9-11	Rift zones, triple junctions, aulacogens
Lectures 12-13	Tectonic framework of Egypt
Lecture 14-17	Global tectonics
Lecture 18-20	Inversion Tectonics
Lecture 21-23	Sedimentary basins
Lectures 24-26	Physical resources of the ocean
Lectures 27-28	Plate tectonics and hydrocarbon accumulation
Weeks 29,30	**Assessment**

4. Teaching and Learning Methods

- Lectures,
- Discussions,
- Exercises and case study,
- Reports and web-researches,
- Field Trips

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 30th Week	100%

*KU: Knowledge and Understanding, I: Intellectual

6. List of references

Essential Books:

- Kearey, P. and Vine, F. 1996: Global tectonics. 2nd edition.

Recommended Books:

- Said, R.1990: The geology of Egypt. 734 p.

Periodicals, Web sites:

- Journal of Tectonics
- Journal of Tectonophysics
- Journal of Structural geology
- Annals of the geological survey of Egypt

7. Facilities required for teaching and learning

- Video Projectors
- Computer Presentations and Writing Boards
- Field trips
- Museum Models
- Library

	Course Coordinator	**Head of Department**
Name	**Prof. Mohamed Atef Noweir**	Prof. Abdel Fattah A. Zalat
Name (Arabic)	**أ. د. محمد عاطف نوير**	**أ. د. عبد الفتاح على زلط**
Signature	………………………………..	…………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Contents	Course outcomes ILOs								
	Knowledge and Understanding			Intellectual			Transferable		
	A1	A2	A3	B1	B2	B3	D1	D2	D3
Historical perspective	☒	☒	☐	☒	☒	☐	☒	☒	☐
Structure and composition of the Earth interior	☐	☒	☐	☐	☒	☐	☒	☒	☒
Subduction zones	☐	☒	☒	☒	☐	☒	☒	☒	☒
Rift zones, triple junctions	☒	☒	☒	☐	☐	☒	☒	☒	☒
Tectonic framework of Egypt	☒	☒	☐	☒	☒	☒	☒	☒	☒
Global tectonics	☒	☒	☐	☐	☒	☒	☒	☒	☒
Inversion Tectonics	☒	☒	☐	☒	☐	☒	☒	☒	☐
Sedimentary basins	☐	☐	☒	☐	☒	☐	☒	☒	☒
Physical resources of the ocean	☒	☒	☐	☐	☒	☒	☒	☐	☐
Plate tectonics and hydrocarbon accumulation	☒	☐	☒	☐	☒	☒	☐	☒	☒

Learning and Teaching Methods-ILOs

Courses	Programme outcomes ILOs												
	Knowledge and Understanding					Intellectual				Transferable			
	A1	A2	A3			B1	B2	B3		D1	D2	D3	
Lectures	X	X											
Discussions		X								X			
Exercises and case study			X			X	X	X					
Reports and web-researches							X				X		
Field Trips			X					X				X	

Assessment Methods-ILOs

Courses	Programme outcomes ILOs												
	Knowledge and Understanding					Intellectual				Transferable			
	A1	A2	A3			B1	B2	B3		D1	D2	D3	D4
Written Examination	X	X	X			X							

Course Title	**Field Geology**	
Course Code	**1424**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Gaafer A. Baharyia**	
Other Staff	**Prof. Mahmoud H. Ashmawy**	
Level	**Graduate-M. Sc.**	
Semester	**Semester One and Two**	
Pre-Requisite	**B. Sc. In Geology**	
Course Delivery	**Lecture**	**28 x 2h lectures**
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

This module aims to demonstrate appropriate field skills for the students, interpret rock outcrops and other forms of surface and subsurface data with appropriate assessments of uncertainly. Also introduce an overview of high and low land geology and surface processes.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. Relationships between surface geologic features.

A2. Pertinent data rock outcrops and surface features.

B. Intellectual skills:

By the end of the course the students should be able to:

B1. Use the knowledge of the Paleontology and stratigraphy.

B2. Differentiate Paleontology and stratigraphy problem-solving procedures and techniques.

B3. Identify and analyze problems critically, set priorities and make professional decisions.

B4. Develop a scientific technical planning based on sufficient Paleontology and stratigraphy field observations.

B5. Test and analyze hypotheses in the field of Paleontology and stratigraphy and deal with relevant to problems.

D. General and transferable skills:

D1. Conduct appropriate scientific communication.

D2. Make use of IT.

D3. Work independently and in a team.

3. Contents

Lectures 1	Introduction
Lectures 2-4	Field evidences and significances
Lectures 5,6	Recent orientations of mapped-geo-items
Lectures 7-9	Recent trends in sampling and field mapping
Lecture 10-12	A problematic point of field observations and their interpretation in the field
Lecture 13	Mid-Term Exam
Lectures 14-16	Contact types and their field criteria
Lectures 17-19	Field measurements using recent techniques
Lectures 20-22	Surficial and subsurface mapping techniques
Lectures 23-28	How to write a short-term and/or extending geological report as well.
	Revision
Weeks 29,30	**Assessment**

4. Teaching and Learning Methods

- Lectures,
- Discussions,
- Exercises and case study,
- Reports and web-researches,
- Field Trips

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 30th Week	100%

*KU: Knowledge and Understanding, I: Intellectual

6. List of references

Essential Books:

- Bevier, M.L. 2005: Introduction to field geology.

Recommended Books:

- Compton, 1985: Geology in the field.

- Barnes, 1995: Basic geologic mapping.

Periodicals, Web sites:

- Journal of Petrology

- Journal of Sedimentary Petrology

- Journal of Structural geology

7. Facilities required for teaching and learning

- Computer, data show and software.

- Field geology instruments.

- Lab. Instruments and drawing tables (Ex. Light tables).

	Course Coordinator	**Head of Department**
Name	Prof. **Gaafer A. Baharyia**	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د. جعفر عبدالعليم بحرية	أ. د. عبدالفتاح على زلط
Signature	…………………………	…………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	Programme outcomes ILOs										
	Knowledge and Understanding			Intellectual					Transferable		
	A1	A2		B1	B2	B3	B4	B5	D1	D2	D3
Introduction	☒	☐		☒	☒	☐	☒	☐	☒	☐	☐
Field evidences	☒	☒		☒	☒	☒	☒	☐	☐	☐	☒
Recent orientations of mapped-geo-items	☒	☒		☒	☒	☒	☒	☐	☐	☐	☒
Recent trends in sampling	☒	☐		☒	☒	☒	☒	☒	☐	☐	☐
A problematic point of field observations	☒	☐		☒	☒	☒	☐	☒	☒	☐	☐
Mid-Term Exam	☒	☒		☐	☐	☒	☒	☒	☒	☐	☒
Contact types and their field criteria	☒	☒		☐	☐	☒	☒	☒	☒	☐	☐
Field measurements using recent techniques	☒	☒		☐	☐	☐	☒	☒	☒	☒	☐
Surficial and subsurface mapping techniques	☒	☐		☐	☐	☐	☒	☒	☒	☒	☒

Learning and Teaching Methods-ILOs

Courses	Programme outcomes ILOs													
	Knowledge and Understanding					Intellectual					Transferable			
	A1	A2				B1	B2	B3	B4	B5	D1	D2	D3	
Lectures	X	X				X								
Discussions		X					X				X			
Exercises and case study								X						
Reports and web-researches							X			X		X		
Field Trips		X						X	X	X			X	

Assessment Methods-ILOs

Courses	Programme outcomes ILOs											
	Knowledge and Understanding					Intellectual				Transferable			
	A1	A2				B1	B2	B3	B4	D1	D2	D3	D4
Written Examination	X	X				X	X						

Course Title	Sedimentation and Correlation	
Course Code	**1425**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Abdel-Monem T. Abdel-Hameed**	
Other Staff		
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B.Sc. in Geology**	
Course Delivery	**Lecture**	**28 x 2h. lectures**
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

This course aims to learn about sequences of sedimentary rocks and how they may be correlated, or traced between outcrops.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this course students should acquire knowledge and understanding of the underlying concepts and principles of:

A4. Sequence of stratigraphy.
A5. Different types of correlation.
A6. Meaning of sequence stratigraphy.
A7. Use of correlation.

B. Intellectual skills:

They should also acquire the ability to*:*

B4. Differentiate between the different types of correlation.
B5. Correlate sea level changes and sequence stratigraphy.

D. General and transferable skills:

D4. Conduct scientific discussions and write reports.
D5. Develop computer skills and work with the webs.
D6. Work independently and in a team.

3. Contents

Lectures 1-4	Stratigraphical procedures
Lectures 6-9	Facies concept
Lectures 10-14	Basics of correlation
Lectures 15-20	Seismic stratigraphy
Lectures 21-23	Changing seal-levels
Lectures 24-28	Cycles and sequences

Weeks 29, 30 **Assessment**

4. Teaching and Learning Methods

- Lectures,
- Discussion, Presentation
- Reports and term papers,
- Computer modeling, Web searching
- Assignments.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 30th Week	100%

*KU: Knowledge and Understanding, I: Intellectual

6. List of references

Essential Books:

- Holland, C. 1978: A guide to Stratigraphical procedure. Geol. Soc. Lond. Spec. Rep. no. 10.

Recommended Books:

- Vail, P. 1977: Stratigraphical interpretation of seismic reflection patterns in depositional sequences.
- Payton, C.: Seismic stratigraphy- Application to hydrocarbon exploration. A.A.P.G. Mem. 26: 99-116.

Periodicals and Web sites:

- Journal of Sedimentology
- Journal of Stratigraphy

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computer Presentations and Writing Boards
- Commercial computer packages: Microsoft package.
- Simulation Lab.
- Field trips

	Course Coordinator	Head of Department
Name	Prof. Abdelmonem T. Abdelhameed	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د. عبدالمنعم توفيق عبدالحميد	أ. د. عبدالفتاح على زلط
Signature	…………………………..	…………………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Contents	Course outcomes ILOs										
	Knowledge and Understanding					Intellectual		Transferable			
	A1	A2	A3	A4		B1	B2	D1	D2	D3	
Stratigraphical procedures	☒	☐	☐	☐		☒	☐	☒	☒	☐	
Facies concept	☒	☒	☒	☐		☒	☒	☒	☐	☐	
Basics of correlation	☒	☒	☒	☒		☒	☒	☒	☐	☐	
Seismic stratigraphy	☒	☐	☒	☒		☒	☒	☒	☐	☐	
Changing seal-levels	☒	☐	☒	☒		☒	☒	☒	☒	☐	
Cycles and sequences	☒	☒	☐	☒		☐	☒	☒	☒	☒	

Learning and Teaching Methods-ILOs

Courses	Programme outcomes ILOs															
	Knowledge and Understanding					Intellectual					Practical		Transferable			
	A1	A2	A3	A4		B1	B2						D1	D2	D3	
Lectures	X	X	X			X										
Discussions, presentation							X						X			
Reports and term papers				X											X	
Computer modeling, Web searching							X							X		
Assignments						X	X								X	

Assessment Methods-ILOs

Courses	Programme outcomes ILOs															
	Knowledge and Understanding					Intellectual				Practical			Transferable			
	A1	A2	A3	A4		B1	B2			C1	C2	C3	D1	D2	D3	D4
Written Examination	X	X	X	X		X	X									

Course Title	**Petroleum Geology**	
	Hydrogeology	
Course Code	**1426**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Nader H. El Gendy**	
Other Staff	**Prof. Mohamed G. Atwia; Dr Shadya Abdel-Reheem; Dr Zenhom E. Salem**	
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B. Sc. Geology**	
Course Delivery	**Lecture**	**28 x 2h lectures**
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

This module is in two halves. **The first half aims to** enable student to gain knowledge about the main approach of petroleum geology including generation, migration, subsurface environment, hydrocarbon traps and hydrocarbon provinces in Egypt. **The second half aims to** gain a much more knowledge and understanding of main approach of Hydrogeology. In addition, give rise to many applications for working in the industry.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. Economic importance of petroleum, maturation of organic matter and its role in petroleum formation.

A2. Influence of the porosity and permeability on the accumulation and distribution of petroleum.

A3. Movement of water and contaminants in the subsurface, geochemistry of groundwater, interpretation of hydraulic and chemical data.

A4. Groundwater exploration, isotope hydrology, groundwater pollution and remediation.

B. *Intellectual skills:*

They should also acquire the ability to:

B1. Estimate the porosity values and types and detect the approximated reservoir rocks and the possible traps in the area.

B2. Measure the source rock maturity and estimates the pathways of the migrating oil.

B3. Apply groundwater flow equations to determine aquifer response to groundwater pumping.

B4. Interpret hydrocarbon and hydrogeologic data.

C. Professional and practical skills:

C1. Design cross sections indicating traps and reservoir rocks.

C2. Evaluate the presence of hydrocarbon in the rock formation and characterize the reservoir rocks.

C3. Train M. Sc students in the proper use of the hydrochemical analysis equipments (TDS, E.C., PH, Flame photometer, Spectrophotometer).

D. General and transferable skills:

D1. Use computer programmes for interpretation and modeling.

D2. Make scientific communications and discussions with others.

D3. Use IT in self-learning.

D4. Work independently and in a team.

3. **Contents**

Part - 1	**Petroleum geology** (An hour/ week)
Lectures 1-4	Generation of petroleum
Lectures 5-8	Reservoir rocks
Lectures 9-12	Porosity and permeability
Lectures 13-17	Hydrocarbon migration
Lectures 18-20	Petroleum traps
Lectures 21-23	Subsurface environment
Lectures 24-25	Production method
Lectures 26-28	Petroleum provinces in Egypt
Part - 2	**Hydrogeology** (An hour / week)
Lectures 1-3	Groundwater Investigations

Lectures 4-6 Pumping Test Analysis

Lectures 7-9 Groundwater Flow theory

Lectures 10-14 Natural Hydrochemistry

Lectures 15-20 Groundwater Pollution

Lectures 21-25 Groundwater Modelling

Lectures 26-28 Hydrogeology of Egypt

Weeks 29,30 **Assessment**

4. Teaching and Learning Methods

-Lectures

-Internet and library search

- Writing Reports

- Field Trips

- Assessments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 30th Week	100%

*KU: Knowledge and Understanding, I: Intellectual

6. List of references

Essential Books:

- Selley, R. 1985: Elements of petroleum geology. New York: W. H. Freeman.

- Leversen, A. 1967: Geology of petroleum, 2nd Ed. San Francisco: W. H. Freeman.

- Fetter, C. W. 2000: Applied Hydrogeology, 4th Ed.

- Todd, D. K. and Mays, L. W. 2004: Groundwater Hydrogeology, 2nd Ed.

Recommended Books:

- Link, P. 1982: Basic petroleum geology. Tulsa, Oklahoma: Oil & gas consultants. Internatonal, Inc.
- Domenico, T. A. and Schwartz, F. W. 1997: Physical and Chemical Hydrogeology. 2nd Ed.
- Appelo and Postma 2005: Geochemistry, Groundwater and pollution. 2nd Ed.

Periodicals, Web sites:

- AAPG Bulletin
- Journal of Geophysical Research
- Journal of Hydrogeology
- Journal of Groundwater
- http://www.petroskills.com

7. Facilities required for teaching and learning

- TDS meter, E.C., PH, Flame photometer (Hydrochemical lab.), Spectrophotometer.
- Computer programming for hydrochemical interpretation and groundwater modelling (hydrogeological software)

	Course Coordinator	**Head of Department**
Name	Prof. Nader H. El Gendy	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ. د. نــادر حسنى الجنــدي	أ. د. عبدالفتاح على زلط
Signature	……………………………	…………………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	Programme outcomes ILOs														
	Knowledge and Understanding				Intellectual				Practical			Transferable			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
Part – 1 Petroleum geology															
Generation of petroleum	☒	☐	☒	☐	☒	☒	☐	☐	☒	☐	☐	☒	☐	☐	☐
Reservoir rocks	☒	☐	☒	☐	☒	☒	☐	☐	☒	☐	☐	☒	☐	☐	☒
Porosity and permeability	☒	☒	☐	☐	☒	☒	☐	☐	☐	☒	☒	☒	☐	☐	☐
Hydrocarbon migration	☒	☒	☐	☐	☒	☒	☐	☒	☐	☒	☒	☒	☒	☐	☐
Petroleum traps	☒	☒	☒	☒	☐	☒	☐	☒	☐	☒	☒	☒	☒	☐	☒
Subsurface environment	☒	☐	☒	☒	☐	☒	☐	☒	☐	☒	☒	☒	☒	☐	☐
Production method	☒	☐	☒	☒	☐	☐	☐	☒	☐	☒	☒	☐	☒	☒	☐
Petroleum provinces in Egypt	☒	☐	☒	☐	☐	☐	☐	☐	☐	☒	☒	☐	☒	☒	☒
Part – 2 Hydrogeology															
Groundwater Investigations	☐	☐	☒	☐	☐	☐	☒	☒	☐	☐	☐	☐	☒	☒	☐
Pumping Test Analysis	☐	☐	☒	☐	☐	☐	☒	☒	☐	☐	☐	☐	☒	☐	☐
Groundwater Flow theory	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒	☐	☐
Natural Hydrochemistry	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐
Groundwater Pollution	☐	☐	☒	☒	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☐
Groundwater Modelling	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☒	☐	☐	☐	☒
Hydrogeology of Egypt	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☒	☐	☒	☒

Learning and Teaching Methods-ILOs

Courses	Programme outcomes ILOs										
	Knowledge and Understanding					Intellectual		Practical	Transferable		
	A1	A2	A3	A4		B1	B2		D1	D2	D3
Lectures	X	X	X			X					
Discussions, presentation							X		X		
Reports and term papers				X							X
Computer modeling, Web searching							X			X	
Assignments						X	X				X

Assessment Methods-ILOs

Courses	Programme outcomes ILOs															
	Knowledge and Understanding					Intellectual				Practical			Transferable			
	A1	A2	A3	A4		B1	B2			C1	C2	C3	D1	D2	D3	D4
Written Examination	X	X	X	X		X	X									

Course Title	**Statistics**	
Course Code	**1638**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Kadry Zakaria Elsherbeny**	
Other staff		
Level	**Graduate-M. Sc.**	
Semester	**Semesters One and Two**	
Pre-Requisite	**B. Sc. Geology**	
Course delivery	**Lecture**	**28 x 1h lectures**
	Practical	**-**
Parent Department	**Mathematics Department**	
Date of Approval	**September, 2014**	

1. Aims

This module aims to provide M. Sc. students in geology with basic concepts of study design and data analysis suitable for laboratory and field research, and to help students to develop the skills needed to apply statistical methods using related statistical software; e.g. Primer or GraphPad in scientific geological research. Emphasis will be on practical and applied skills using example of relevance to biology students.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

- A1. statistical measures for data description; statistical estimation; correlations and testing hypothesis.
- A2. study design.
- A3. types of variables that are used in biological research.
- A4. sampling variation, how to quantify the variability, and its role in comparing groups or categories.

***B. Intellectual skills**:*

- B1. carry out confidently simple essential statistical methods in biological research and to interpret results.
- B2. select appropriate statistical methods for analysis of simple data sets and apply them on a computer using bio-statistical software, GraphPad.
- B3. summarize data using graphical and tabular data.
- B4. interpret research findings and explain them in a clear, concise and logical manner.

C. Professional and practical skills

- C1. select and apply appropriate basic statistical methods for analysis of data.
- C2. use GraphPad package in data analysis.

C3. tackle skills in handling data on a computer and otherwise, and deriving and presenting quantitative results using appropriate tables, figures, and summaries.

D. Transferable skills

D1. write report including graphical material.

D2. present and discuss the finding from statistical analysis in a clear, concise and logical manner.

D3. use internet and other electronic sources as a source of information.

3. Contents

Analysis and design of research studies (two hours/week)

Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.
Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.
Lectures 27-28	Design of experiments: The null hypothesis, statistical significance and rejecting the null hypothesis.
Weeks 29, 30	**Assessment**

4. Teaching and Learning Methods

- Lectures are an integral part of course delivery in this course, supported by problems classes, tutorial groups, computational work, office hours, and individual tutorials.
- Students engage in private study in which they work through set problem sheets and individual assignments as well as assimilating lecture content.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 16th Week	90%
Oral Assessment	KU, I	Assessment Session	Term Final	5%
Semester work	KU, I	Continuous Assessment		5%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential books

- Glantz, Stanton A. (2005): Primer of Biostatistics, 6th Edition McGraw-Hill.

Recommended books

- Samuels, M. L. (1989): Statistics for the Life Sciences. Dellen Publishing Company, USA.
- Rosner, B. (1990): Fundamentals of Biostatistics. PWS-Kent Publishing Company, USA.

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computers Presentations and Writing Boards
- Primer or GraphPad biostatistics software.

	Course Coordinator	Head of Department
Name	Prof. Kadry Zakaria Elsherbeny	Prof. Kadry Zakaria Elsherbeny
Name (Arabic)	أ. د. قدرى زكريا الشربينى	أ. د. قدرى زكريا الشربينى
Signature	………………………………..	………………………………
Date	/9/2014	/9/2014

Contents – Course ILOs Matrix

Courses	Programme outcomes ILOs													
	Knowledge and Understanding				Intellectual				Practical			Transferable		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3
Introduction	☒	☒	☒	☒	☒	☒	☐	☒	☐	☐	☒	☒	☒	☐
Summarizing data	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐	☒	☐	☐
Sampling variability of a mean	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐	☒	☐	☐
Analysis of quantitative data	☒	☐	☐	☐	☒	☒	☒	☒	☐	☒	☒	☒	☐	☐
ANOVA	☒	☐	☐	☐	☒	☒	☐	☒	☐	☒	☒	☒	☒	☐
Sampling variability of proportions	☒	☒	☒	☒	☐	☒	☒	☒	☐	☒	☒	☒	☒	☐
Analysis of categorical data	☒	☒	☒	☒	☐	☒	☒	☒	☐	☒	☒	☒	☒	☐
Regression and correlation	☒	☒	☒	☒	☐	☐	☒	☒	☐	☒	☒	☐	☒	☒
Comparing correlations	☒	☒	☒	☐	☐	☐	☒	☒	☐	☒	☒	☐	☒	☒
Regression and correlation	☒	☒	☒	☐	☐	☐	☒	☒	☐	☒	☒	☐	☒	☒
Comparing distribution	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒	☐	☐	☒	☒
Comparing means	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒	☐	☐	☒	☐
Comparing variances	☒	☒	☒	☐	☐	☐	☐	☐	☐	☒	☒	☐	☒	☒
Design of experiments	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☒	☐	☒	☒

Learning and Teaching Methods-ILOs

Courses	Programme outcomes ILOs														
	Knowledge and Understanding					Intellectual				Practical		Transferable			
	A1	A2	A3	A4		B1	B2	B3	B4			D1	D2	D3	
Lectures	X	X	X			X	X	X				X	X		
private study				X					X					X	

Assessment Methods-ILOs

Courses	Programme outcomes ILOs													
	Knowledge and Understanding				Intellectual				Practical			Transferable		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3
Written Examination	X	X	X	X	X	X								
Oral Assessment							X	X					X	
Semester work								X				X		X

Course Title	Computer	
Course Code	1429	
Academic Year	2013/2014	
Coordinator	Prof. Mohamed El-Awady	
Other Staff	Prof. Mahmoud Kamel; Prof. Qadry Zakaria	
Semester	Taught over 2 semesters	
Pre-Requisite	B.Sc.	
Course Delivery	Lecture	28 x 1h lectures
	Practical	28 x 1h practical
Parent Department	Computer Centre	
Date of Approval	September, 2014	

1. Aims

This course will enable students to acquire a range of transferable skills that are important for post graduate M. Sc. students to:

7) Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.
8) Underpin academic work throughout postgraduate studies.
9) Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A8. The use of IT in the context of their postgraduate studies.
A9. The diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.
A10. Necessary graphical, statistical and frequency analyses of different types of data.
A11. Powerful presentation using sophisticated software packages.
A12. Different internet resources.
A13. Solution of scientific problems using computer programming.
A14. Photo enhancing and manipulation techniques.

B. Intellectual skills:

They should also acquire the ability to:

B3. Integrate different application programs to develop effective information analysis and presentation.

C. Professional and practical skills:

C1. Use a number of computer packages to present information.

D. General and transferable skills:

D3. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Lectures 1-2	Methods for graphical representations, Data analysis and Data modeling
Lectures 3-4	Assignment 1 : Using Application programs Calculation of Slope and intersection of lines , Best fitting for data, Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)
Lectures 5-6	Statistical Data analysis
Lectures 7-9	Assignment 2 : Using Application programs Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data
Lectures10-11	Creating powerful presentation including charts, images, video, etc and different attractive animations
Lectures12-14	Assignment 3 : Using PowerPoint program Design a real and powerful presentation with different acquired skills
Lectures15-17	Use of internet capabilities and searching engines Assignment 4: Using the Internet Life search on the internet for some real information
Lectures18-20	Creating Data Base and related Queries and Reports Assignment 5: Using Application programs Creating a real Data Base and apply different queries and reports to extract useful information
Lectures21-23	Computer programming language Assignment 6: Programming using Visual Basic 6 Solving real problems using a computer language
Lectures24-26	Photo manipulation and enhancement using the photoshop Assignment 7: Using the Photoshop program Practicing on manipulation and enhancing of images
Lectures 27-28	Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities
Weeks 29-30	Assessment

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Assignments

The course is delivered through lectures, practical sessions and assignments. Team working skills are developed on a week-long laboratory exercises and the students present and defend their findings in a public seminar.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

	Course Coordinator	Head of Department
Name	Prof. Mohamed M. El-Awady	Prof. El-Said Taha Rizk
Name (Arabic)	أ.د.محمد العوضي	أ.د. السيد طه رزق
Signature	……………………………	…………………………………………..
Date	/9/2014	/9/2014

Contents – Course ILOs Matrix

Contents	Knowledge and Understanding							Practical	Transferable	
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Methods for graphical representations	☒	☒	☐	☐				☒	☒	☐
Statistical Data analysis	☒	☒	☐	☐				☒	☒	☐
Creating powerful	☒	☒	☒	☒				☒	☒	☐
Use of internet capabilities and searching engines	☒	☒	☐	☒	☒			☒	☒	☐
Creating Data	☒	☒	☒	☐				☒	☒	☒
Computer programming language	☒	☒	☒	☐		☒		☒	☒	☒
Photo manipulation	☒	☒	☐	☒			☒	☐	☒	☒
Introduction to Data frequency analysis	☒	☒	☐	☒		☒		☐	☒	☒

Learning and Teaching Methods-ILOs

Contents	Knowledge and Understanding							Intellectual skills	Practical	Transferable
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Lectures	X	X	X	X	X		X			
Practical classes								X	X	X
Assignments						X				X

Assessment Methods-ILOs

Contents	Knowledge and Understanding							Intellectual skills	Practical	Transferable
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Lectures	X	X	X	X	X		X			
Practical Examination								X	X	X
Semester work						X		X		X

Course Title	**Essay and Research**	
Course Code	**24096**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Abdel Fattah A. Zalat**	
Other Staff	**All Geology Staff**	
Level	**Graduate-M. Sc.**	
Semester	**Two Semesters**	
Pre-Requisite		
Course Delivery	**Tutorial**	**Tutorial setting with the supervisor: 14 x 2h**
		At least once every 2 weeks
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

By the end of this course, students will be able to:

7) Develop geologic approaches that meet community needs considering economic, environmental, social, ethical, and safety requirements.
8) apply geologic facts and theories to analyze and interpret practical geologic data
9) Collect, analyze, and present data using appropriate format and techniques.
10) Postulate concepts and choose appropriate solutions to solve problems on scientific basis.
11) Use effectively information technology and the software packages relevant to the geological problems.
12) Adopt self and long life-learning and participate effectively in research activities.

2. Intended Learning Outcomes

A. Knowledge and understanding:

Upon successful completion of this course the students should acquire knowledge and an understanding of:

A1) theortical bases, procedures and techniques used for geological field studies and related laboratory analysis.

B. Intellectual skills:

They will also acquire the ability to:

B4. Develop the capability of interpretation and analysis of geologic data.
B5. Assume a range of ideas to solve different geological problems.
B6. recognize and differentiate between the published geological data

C. Professional and practical skills:

C1. Apply scientific ethics for accuracy during reporting.

C2. Employ the geologic bases to meet community needs.

C3. Investigate previous work and references.

D. General and transferable skills:

D7. Use information and communication technology effectively.

D8. Identify roles and responsibilities, and their performing manner.

D9. consider community linked problems

D10. Acquire self-and long life-learning.

D11. Apply scientific models and systems effectively.

D12. Deal with scientific patents considering property right.

3. Contents

This module is given over two semesters with no fixed programme. It will give students the opportunity to develop their written communication skills by being given practice at obtaining information from a variety of sources, organizing and presenting it as a cogent argument.

4. Teaching and Learning Methods

- **Small group tutorials** (1 member of staff to 1-5 students, usually following the same or related programs). 4 sessions per semester. Students tutored by different staff members in the two semesters to ensure diversity of styles and experiences. Required to write an assessed essay over the 2 semesters and to undertake preparatory work as required by the tutor.
- Students are encouraged to devote private study time to reading from a collection of general texts held in the library and to be aware of current developments via the popular scientific press.
- **Supervision**: The level of contact between students and supervisors during project work will vary across the different disciplines in the Faculty but all students are required to maintain regular contact with the supervisor. This is the student responsibility. Student should note that they are required to meet with the supervisor at least once every two weeks during the semesters to discuss progress. Student may, of course, make an appointment to see his supervisor at any time. Students who fail to make regular contact with the Supervisor will be reported to the Coordinator of Teaching. Students should remember, the supervisor is also his personal tutor with whom he should raise any issues of concern which may be affecting his work.

5. Student Assessment

There are three parts to the assessment of the project:

1. Essay Structure: 5000 words (50% awarded by supervisor and second assessor): Project report in the style of a scientific paper and supervisors mark, reflecting student effort, commitment and input to project plus team-working skills where appropriate.
2. Student conduct (20% awarded by supervisor): Student portfolio on the review of the literature pertinent to project area.
3. Seminar (30% awarded by supervisor and second assessor): oral presentation to peers and academic staff.

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Oral Assessment	KU, I	Assessment Session	Term Final	30%
Student portfolio	KU, I	Continuous Assessment		50%
Seminar	P, T	Assessment Session	Term Final	20%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

- Initially, students are provided with a limited number of references relating to their subject area, but then are expected to search the literature on their own.

Recommended Books:

- Day R. A. 1986: How to write and publish a scientific paper. Cambridge University Press, Fourth Edition.
- Master, PA. 1986: Science, Medicine and Technology: English grammer and technical writing. Prentice-0Hall, Inc., Engllewood Cliffs, New Jersey 07632.

Web sites:

- www.thomsonrights.com

7. Facilities required for teaching and learning

- Library
- Web Searching

	Course Coordinator	Head of Department
Name	Prof. Abdel Fattah A. Zalat	Prof. Abdel Fattah A. Zalat
Name (Arabic)	أ. د. عبد الفتاح علي زلط	أ. د. عبد الفتاح علي زلط
Signature		
Date	/9/2014	/9/2014

M. Sc. Programme
of
Applied Geophysics

Programme Specification

Programme Title	**Master of Applied Geophysics**
Award	**Master of Applied Geophysics**
Parent Department	**Geology Department**
Teaching Institution	**Faculty of Science - TU**
Awarding Institution	**Tanta University**
Coordinator	**Prof. Nader H. El-Gendy**
External Evaluator(s)	**Prof. Dr. Salah N. Ayad, professor of geology, Faculty of Science, Mansura University**
QAA Benchmarking Standards	**Academic Reference Standards (ARS)**
Other Reference Points	
Date of intake	**Every year in September**
Review Date	**Internal Periodic Review, Summer 2014**
Date of Approval	**September, 2014**

1. Aims

This program enables postgraduate students to:

1) Gain a thorough background of the different geophysical techniques.
2) Learn how to acquire, process and interpret different types of measurements
3) Acquire the necessary practical skills needed for lifelong professional development and appreciation of the values of science to society.

2. Intended Learning outcomes

A. Knowledge and understanding:

By the end of this program postgraduate students should acquire knowledge and understanding of:

A1. the basics of the different geophysical methods and the techniques used in different settings of geophysical surveying.

A2. the use of different geophysical instruments in the field in the search for oil, minerals, and underground water.

A3. the potential factors affecting different geophysical measurements, and their implications in terms of mathematical computations of different geometrical structures and their expressions.

B. Intellectual skills:

They will also acquire the ability to:

B13. Write a hypothesis, plan and execute laboratory investigation or development work, evaluate the outcomes and draw valid conclusions.

B14. Analyze subject knowledge and understanding to address familiar and unfamiliar problems related to geophysics.
B15. Propose synthesise and assimilate diverse information in a critical manner.
B16. Select reasoned arguments to support a position on the ethical and social impact of scientific advances and appreciate the existence of different points of view.
B17. Compose theory and practice.

C. Professional and practical skills:

C13. Store, collate, analyse and report data of laboratory and field geophysical investigations.
C14. Use laboratory and field investigations in a liable, safe and ethical manner.
C15. Explain and conduct various forms of laboratory and field investigations in specific, precise and accurate manner.

D. General and transferable skills:

D18. Write about a subject clearly, confidently and effectively using a range of presentational techniques.
D19. Use numerical and IT skills with confidence and accuracy.
D20. Work both independently and in collaboration with others.
D21. Take responsibility for self-managed learning and personal/ professional development.

3. Academic standards

3.A External references for standards (Benchmarks):

Academic Reference Standards (ARS)

3.B Comparison of provision to external references:

Academic Reference Standards (ARS).

3. Academic Reference Srandards:

The Academic Reference Standards for the program of the M.SC. degree in Applied Geophysics as well as the attributes and capabilities of the graduates were based essentially on the **General Academic Reference Standards (ARS) of graduate studies** published by the National Authority for Quality Assurance and Accreditation of Education (NAQAAE 2009). The following Specific Academic Standards for the Master Degree in Applied Geophysics are adopted and were approved by the Faculty Council in 20/11/2012

Specific Academic Reference Standards

3.1 Graduate Attributes

The postgraduates of M.Sc. in Applied Geophysics must have been

Prepared for:

1.1 Systematic understanding and critical awareness of topics in the area of applied geophysics

1.2 Problems of routine nature, which are generally adequately solved.

1.3 Generic skills, which are appropriately developed by professional practices.

1.4 Advanced studies in the area of applied geophysics to support research work.

1.5 Information gathering, evaluation of published information, critical analysis of data.

1.6 Field and experimental work is carried out independently in a reliable and efficient manner.

3.2. Knowledge and Understanding

By the end of the M.Sc. program, the postgraduate students must be able

to acquire knowledge and understanding of:

2.3 In-depth knowledge of the core themes of applied geophysics.

2.2 Different important procedures and techniques used in the field of geophysical analyses.

2.3 The ethics and bases of scientific research in general and that of the geophysical research in particular.

2.4 Theories of geophysical sciences and broaden his/her scope of theories of other interdisciplinary fields.

3.3. Intellectual Skills

By the end of the M.Sc. program, the postgraduate students must be able to:

3.1- Use the knowledge of the applied geophysics.

3.2- Differentiate geophysical problem-solving procedures and techniques.

3.3- Identify and analyze problems critically, set priorities and make professional decisions.

3.4- Develop a scientific technical planning based on sufficient applied geophysical field observations.

3.5- Test and analyze hypotheses in the field of applied geophysics and deal with relevant to problems.

3.4. Practical and Professional Skills

By the end of the M.Sc. program, the postgraduate students must be able to:

4.1- Digest, critically evaluate and present applied geophysical research.

4.2- Appreciate kinds of data limitation and accuracy.

4.3- Write professional reports efficiently.

4.4- Create plans to maximize the quality of the applied geophysical analytical performance.

4.5- Evaluate resources of data in the applied geophysical research and renovate them.

3.5. General and Transferable Skills

By the end of the M.Sc. program, the postgraduate students must be able to:

5.1- Attain an independent learning technique for a lifetime, professional career development in the field of applied geophysics.

5.2- Work out geophysically-based initiative plans and deal with stress and time management.

5.3- Communicate verbally and exchange the results and information successfully.

5.4- Use information and communication technology.

4. Curriculum Structure and contents:

4.A Programme duration One Year

4.B Programme structure

4.B.1	Number of contact hours		per Week:					
		First term:	Lectures	15	Lab.		Total	
		Second term:	Lectures	15	Lab.		Total	
	Overall	Contact hours	Lectures	30	Lab.		Total	

4.B.2	Number of contact hours	Compulsory	30	Optional	None	Optional	None
4.B.3	Number of credit hours of specialized courses			No.	36	%	100
4.B.4	Number of contact hours of courses of social sciences and humanities:			No.	-	%	-
4.B.5	Number of credit hours of other courses:			No.		%	

5. Programme courses

Year 1	Course Title	Lec.	Prac.	Exer.	Program ILOs Covered
Code	Three of the first four courses are obligatory	Hours			
1431	Gravity methods	2	-	-	
1432	Seismic methods	2	-	-	
1433	Electrical methods	2	-	-	
1434	Magnetic methods	2	-	-	
1435	Essay	2	-	-	
1436	Statistics	1	-	-	
1437	Computer	1	1	-	

6. Programme admission requirements

The applicants must have obtained a Bachelor’s degree, or its equivalent, in Geology with a “good” degree as a minimum for approval.

7. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression:

- The programme includes one year of coursework, followed by a research project, i.e. the Master thesis, by laboratory investigation in a mentored environment.
- Assessment is held by the end of the first year, and student will be eligible only on attaining a “pass” degree (60%).
- The student who fails certain course at the first attempt will be eligible for only a “Pass” degree following only one re-set examination.
- The student can submit his thesis only after one year from the date of the Faculty Council approval on the thesis subject.

8. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Not applied yet	
2. Alumni	Not applied yet	
3. Stakeholders (Employers)	Not applied yet	
4. External Evaluator(s) (External Examiner(s))	Prof. Salah N. Ayad	

Thesis

The thesis of M.Sc. in Applied Geophysics is a formal written document representing sustained research contributes to the accumulated understanding of the Applied Geophysics field. Throughout the preparation of the thesis student demonstrate in-depth, specialist knowledge and sophisticated understanding of concepts, information and techniques at the forefront of the discipline; exhibit mastery in the exercise of intellectual abilities including theoretical and practical skills; take a proactive and self-reflective role in working and to develop professional relationships with others; proactively formulate ideas and hypotheses;

evaluate current issues; develop, implement and execute plans meeting deadlines and to employ IT and library resources appropriately

Responsibility for different phases in the preparation and checking of a graduate thesis rests jointly with the student, the members of supervision committee and the graduate office. The supervision committee may control of the following:

4. Thesis divisions and their order
5. Terminology for the division
6. The arrangement of reference material.

A graduate thesis is a permanent evidence of contribution made by students in particular field of knowledge and should reflect credit on the University as well as on the students. Student has a duty to present findings not only with precision, but also intelligently and attractively.
A thesis must include all the significant results obtained and must disclose all the methods and processes employed in research in such a detail that the work may be repeated by anyone skilled in the field. The student should be scrupulously careful to give references to all the work on which the thesis depends directly or significantly. Good usage requires documentation of statements whenever possible by reference to published and unpublished.

The thesis should contain the following:

- Title page (title, name of student, university, faculty, name of program, date, supervisors)
- Table of contents
- Introduction, containing a definition of the thesis statement and the aim.
- Literature review.
- Materials and methods.
- Results.
- Discussion and conclusions.
- References.

Language of the thesis:

- The thesis is written in English accompanied by a summary in Arabic.

One accepted paper is required

- Before the thesis can be presented for granting the M.Sc. degree, at least one accepted paper is required

Apply the thesis to the Department Council

- With the approval of the thesis by the supervision committee, the student can apply the thesis to the Department Council.

Examiners Committee

- The examiners committee is selected by Geology Department Council. The M.Sc. Degree is awarded to the applicant by Tanta University Council, upon the recommendation of the department and the Faculty Council.

We certify that all of the information required to deliver this programme is contained in the above specification and will be implemented. All course specifications for this program are in place.

Courses – Programme ILOs Matrix

Courses	Programme outcomes ILOs														
	Knowledge and Understanding			Intellectual					Practical			Transferable			
	A1	A2	A3	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4
1431 Gravity methods	☒	☒	☐	☐	☒	☐	☒	☐	☐	☐	☐	☒	☒	☐	☐
1432 Seismic methods	☐	☒	☒	☐	☒	☒	☒	☐	☐	☐	☐	☐	☒	☐	☐
1433 Electrical methods	☐	☐	☐	☐	☒	☒	☒	☐	☐	☐	☐	☐	☒	☒	☒
1434 Magnetic methods	☐	☒	☒	☐	☒	☒	☒	☐	☐	☐	☐	☐	☒	☒	☒
1427 Essay	☐	☐	☒	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒
1428 Statistics	☐	☐	☒	☒	☐	☐	☐	☒	☐	☐	☐	☒	☒	☒	☒
1429 Computer	☐	☐	☒	☒	☐	☐	☐	☒	☒	☐	☐	☐	☒	☒	☒

Name	Signature	Date
Programme Coordinator: Prof. Nader H. El-Gendy أ. د.نادر حسنى الجندى	…….……..………..………	/9/2014
Head of Quality Assurance Unit: Prof. Hoda K.El-Sayied أ. د.هدى كمال السيد	…….……..………..………	/9/2014
Dean of the Faculty: Prof. Tarek A. Fayed أ. د. طارق عبد المنعم فايد	…….……..………..………	/9/2014

Course Title	**Gravity Methods**	
Course Code	**1431**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Mohamed El Awady**	
Other Staff	**Prof. Mohamed R. Soliman**	
Level	**Graduate-M.Sc.**	
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc. in Geology or Geophysics**	
Course Delivery	**Lecture**	**28 x 2h lectures**
Parent Department	**Geology**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to:

1. Gain knowledge of the main concepts of gravity of the earth.
2. carry out different types of measurements and apply relevant corrections
3. interpret data and handle different problems encountered

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. Main basic of gravitational potential field.

A2. Different subsurface structures throw solving problems..

A3. Proper interpretation

B. Intellectual skills:

They should also acquire the ability to:

B1. measure 2-D and 3-D subsurface structures using different models

B2. draw the subsurface tectonic and basement surface maps.

B3. interpret the deduced tectonic structure and determine parameters..

D. General and transferable skills:

D1. Appropriate scientific communication.

D2. work independently and within a team.

D3. make good use of IT knowledge.

3. Contents

Lectures 1-4	Basics of gravity methods
Lectures 5-7	Types of gravity corrections
Lectures 8-10	Types of gravity surveying
Lectures 11-15	Data separation
Lectures 16-20	Gravity effects from forms
Lectures 21-25	Interpretation methods, density determination by gravity isostasy
Lectures 21-28	Application of gravity methods
Weeks 29, 30	**Assessment**

4. Teaching and Learning Methods

- Lectures
- Web search assignments
- Writing reports

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 30^{th} Week	100%

*KU: Knowledge and Understanding, I: Intellectual

6. List of references

Essential Books:

- Gravity and magnetic oil prospecting, Nettleton, 1976.
- Introduction to geophysical prospecting (Dobrin, and Savit, 1988)

Recommended Books:

- Applied Geophysics (Telford et al., 1990)
- Gravity and magnetic oil prospecting, Nettleton, 1976.

Periodicals, Web sites:

- J. Geophysical Research
- J. Earth planet. Interiors

- Geophysical J. International.

7. Facilities required for teaching and learning

- Computer
- Data show projector
- Sophisticated licensed software

	Course Coordinator	Head of Department
Name	Prof. Mohamed M. El Awady	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ.د. محمد محمد العوضى	أ.د. عبدالفتاح على زلط
Signature	……………………………..	…………………………………..
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Courses	Programme outcomes ILOs									
	Knowledge and Understanding			Intellectual			Transferable			
	A1	A2	A3	B1	B2	B3	D1	D2	D3	
Basics of gravity methods	☒	☒	☐	☐	☒	☐	☒	☒	☐	
Types of gravity corrections	☐	☒	☒	☐	☒	☒	☐	☒	☐	
Types of gravity surveying	☐	☐	☐	☐	☒	☒	☐	☒	☒	
Data separation	☐	☒	☒	☐	☒	☒	☐	☒	☒	
Gravity effects from forms	☒	☐	☐	☒	☐	☐	☐	☐	☒	
Interpretation methods, density determination by gravity isostasy	☐	☐	☐	☒	☐	☐	☒	☒	☒	
Application of gravity methods	☐	☐	☒	☒	☐	☐	☐	☒	☒	

Learning and Teaching Methods-ILOs

Learning and Teaching Methods	Course outcomes ILOs												
	Knowledge and Understanding					Intellectual				Transferable			
	A1	A2	A3			B1	B2	B3		D1	D2	D3	
Lectures	X	X	X			X				X			
Web search assignments			X					X		X	X		
Writing Reports		X					X					X	

Assessment Methods-ILOs

Assessment Methods	Course outcomes ILOs												
	Knowledge and Understanding					Intellectual				Transferable			
	A1	A2	A3			B1	B2	B3		D1	D2	D3	
Written Examination	X	X	X			X	X						

Course Title	Seismic Methods	
Course Code	**1432**	
Academic Year	**2014/2015**	
Coordinator	**Dr Moataz Kh. Barakat**	
Other Staff		
Level	**Graduate-M. Sc.**	
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc. in Geology or Geophysics**	
Course Delivery	**Lecture**	**28 x 2h lectures**
Parent Department	**Geology**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to:

1) identify major geologic features on seismic data.
2) generate simple seismic time/structure maps.
3) interpret simple attribute extractor maps.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. seismic signals and seismic nose.

A2. 2 and 3D seismic data.

A3. methods of acquisition and processing.

B. Intellectual skills:

They should also acquire the ability to:

B1. measure 2-D and 3-D subsurface structures using seismic methods

B2. adept in exploiting modern data interpretation workstation software.

B3. interpret the seismic amplitudes.

D. General and transferable skills:

D1. Appropriate scientific communication.

D2. work independently and within a team.

D3. make good use of IT knowledge.

3. Contents

Lectures 1-3	Seismic signal and seismic noise
Lectures 4-6	2 and 3D seismic data acquisition and processing
Lectures 7-9	Problems associated with statistic correlations for land data
Lectures 10-12	Overview of seismic velocities time and depth migration
Lectures 13-15	2 and 3D interpretation; similarities and differences interpretation
Lectures 16-18	Structural and geologic interpretation
Lectures 19-20	Interpreting seismic amplitudes
Lectures 21-23	Complex attributes, thin bed tuning and spectral decomposition
Lectures 24-25	AVO and seismic data visualizations
Lectures 26-28	Problems associated with gridded maps
Weeks 29, 30	**Assessment**

4. Teaching and Learning Methods

- Lectures
- Web search assignments
- writing reports

5. Student Assessment

Assessment Method	**Skills assessed***	**Assessment Length**	**Schedule**	**Proportion**
Written Examination	KU, I	3 Hour Examination	The 30th Week	100%

*KU: Knowledge and Understanding, I: Intellectual

6. List of references

Essential Books:

- Introduction to geophysical prospecting (Dobrin, and Savit, 1988)
- Applied Geophysics (Telford, et al., 1990)

Recommended Books:

- Veeken,P. c. H. (2007): Seismic Stratigraphy, basin analysis and reservoie characterization. Vol. 37: 509 pp. – Elsevier, oxford. UK.

- Applied Geophysics (Telford et al., 1990)

Periodicals, Web sites:

J. Geophysical Research

J. Earth planet. Interiors

Geophysical J. International.

7. Facilities required for teaching and learning

- Computer

- Data show projector, Sophisticated licensed software

Course Coordinator		Head of Department
Name	Dr Moataz Barakat	Prof. Abdelfattah Ali Zalat
Name (Arabic)	د. معتز خيرى بركات	أ.د. عبدالفتاح على زلط
Signature	……………………………..	……………………………………….
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Contents	Course outcomes ILOs									
	Knowledge and Understanding			Intellectual				Transferable		
	A1	A2	A3	B1	B2	B3		D1	D2	D3
Seismic signal and seismic noise	☒	☒	☐	☐	☒	☐		☒	☒	☐
2 and 3D seismic data acquisition and processing	☐	☒	☒	☐	☒	☒		☐	☒	☐
Problems associated with statistic correlations for land data	☐	☐	☐	☐	☒	☒		☐	☒	☒
Overview of seismic velocities time and depth migration	☐	☒	☒	☐	☒	☒		☐	☒	☒
2 and 3D interpretation; similarities and differences interpretation	☒	☐	☐	☒	☐	☐		☐	☐	☒
Structural and geologic interpretation	☐	☐	☐	☒	☐	☐		☒	☒	☒
Interpreting seismic amplitudes	☐	☐	☒	☒	☐	☐		☐	☒	☒
Complex attributes, thin bed tuning and spectral decomposition	☐	☐	☒	☒	☐	☐		☐	☒	☒
AVO and seismic data visualizations	☐	☒	☒	☒	☒	☐		☐	☒	☒
Problems associated with gridded maps	☐	☒	☒	☒	☒	☐		☐	☒	☒

Learning and Teaching Methods-ILOs

Learning and Teaching Methods	Course outcomes ILOs										
	Knowledge and Understanding			Intellectual				Transferable			
	A1	A2	A3	B1	B2	B3		D1	D2	D3	
Lectures	X	X	X	X				X			
Web search assignments			X			X		X	X		
Writing Reports		X			X					X	

ssessment Methods-ILOs

Assessment Methods	Course outcomes ILOs										
	Knowledge and Understanding			Intellectual				Transferable			
	A1	A2	A3	B1	B2	B3		D1	D2	D3	
Written Examination	X	X	X	X	X						

Course Title	Electrical Methods	
Course Code	**1433**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Nader Hosni El Gendy**	
Other Staff		
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc. in Geology or Geophysics**	
Course Delivery	**Lecture**	**28 x 2h lectures**
Parent Department	**Geology**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to:

A1. Provide with basic concepts of electrical methods.

A2. Differentiate between methods employing natural and artificial electrical sources.

A3. Realize the importance of electrical logging in solving geological problems.

A4. Ground water exploration.

A5. Engineering geology.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. Electrical methods (theoretical back ground-relation between resistivity and geology)

A2. Resistivity survey (traditional resistivity survey-advantages and disadvantages of different arrays).

A3. Self-potential and resistivity logging.

B. Intellectual skills:

They should also acquire the ability to:

B1. Interpret of the geoelectrical data (type of electrical sound curve or horizontal stratified media).

B2. Interpret the induced polarization data.

B3. Analyze the self-potential and resistivity logs.

B4. Apply electrical method for ground water exploration and for engineering applications.

D. General and transferable skills:

D1. Conduct appropriate scientific communication.

D2. Work independently and within a team.

D3. Make good use of IT knowledge.

3. Contents

Lectures 1-4 Principal of electrical resistivity method

- Horizontal profiling technique (HP)
- Vertical electrical sounding technique (VES)

Lectures 5-7 Interpretation of vertical electrical sounding data

- Curve matching technique
- Iso-apparent resistivity contour map
- Geoelectric cross section

Lectures 8-10 Interpretation of resistivity profiling data

- Electrical imaging surveys for environmental and engineering studies
- Engineering and ground water application of electrical resistivity measurement

Lectures 11-15 Induced polarization method

Lectures 16-19 Sp logging (origin and measuements)

Lectures 20-22 Deep resistivity logging

Lectures 23-25 Induction logging

Lectures 26-28 Shallow resistivity logging

Weeks 29, 30 **Assessment**

4. Teaching and Learning Methods

- Lectures
- Web search assignments
- Writing reports
- Discussion

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 30th Week	100%

*KU: Knowledge and Understanding, I: Intellectual

6. List of references

Essential Books:

- Serra, O 1984: Fundamentals of well log interpretation. Amsterdam, Oxford, New York, 250p.
- Sharma, P.V., 1986. Geophysical methods in geology. Elsevier, Amsterdam, 442p.

Recommended books

- Keller, 1984: Electrical methods in Geophysical prospecting. I.I.C. Holland
- Dobrin, M. 1960: introduction to geophysical property. Mc. Graw-Hill Book Company, New York, 630p.
- Schlumberger, 1987: log interpretation principles/Applications.

Periodicals, Web sites

J. Geophysical Research
Earth Planet. Science Letters
Geophysical J. International.

7. Facilities required for teaching and learning

- Computer
- Data show projector
- Sophisticated licensed software

	Course Coordinator	Head of Department
Name	Prof. Nader Hosni El Gendy	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ.د. نادر حسنى الجندى	أ.د. عبدالفتاح على زلط
Signature	……………………………….	…………………………………………
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Course outcomes ILOs	Knowledge and Understanding				Intellectual				Transferable			
Course Contents	**A1**	**A2**	**A3**		**B1**	**B2**	**B3**	**B4**	**D1**	**D2**	**D3**	
Principal of electrical resistivity method	☒	☒	☐		☐	☒	☐	☐	☒	☒	☐	
Interpretation of vertical electrical sounding data	☐	☒	☒		☐	☒	☒	☒	☐	☒	☐	
Interpretation of resistivity profiling data	☐	☐	☐		☐	☒	☒	☐	☐	☒	☒	
Induced polarization method	☐	☒	☒		☐	☒	☒	☒	☐	☒	☒	
Sp logging (origin and measurements)	☒	☐	☐		☒	☐	☐	☐	☐	☐	☒	
Deep resistivity logging	☐	☐	☐		☒	☐	☐	☐	☒	☒	☒	
Induction logging	☐	☐	☒		☒	☐	☐	☒	☐	☒	☒	
Shallow resistivity logging	☐	☒	☒		☒	☒	☐	☒	☐	☒	☒	

Learning and Teaching Methods-ILOs

Learning and Teaching Methods	Course outcomes ILOs									
	Knowledge and Understanding			Intellectual				Transferable		
	A1	A2	A3	B1	B2	B3	B4	D1	D2	D3
Lectures	X	X	X	X				X		
Web search assignments						X		X	X	
Writing Reports					X		X			X
Discussion				X	X			X	X	

Assessment Methods-ILOs

Course outcomes ILOs	Knowledge and Understanding			Intellectual				Transferable		
Assessment Methods	A1	A2	A3	B1	B2	B3	B4	D1	D2	D3
Written Examination	X	X	X	X	X					

Course Title	**Magnetic Methods**	
Course Code	**1434**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Mohamed R. Soliman**	
Other Staff	**Dr. Shadia T. El-Khodary**	
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc. in Geology or Geophysics**	
Course Delivery	**Lecture**	**28 x 2h lectures**
Parent Department	**Geology**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to:

1) gain knowledge of the basics and concepts of different types of magnetism.
2) analyze different types of magnetic data.
3) interpret magnetic data in different geologic settings

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A1. magnetic methods

A2. separation of different types of magnetic data sets.

A3. handling and interpretation of different magnetic data types

B. Intellectual skills:

They should also acquire the ability to:

B1. visualize how earth's magnetic field initializes

B2. compute current and past geomagnetic variations

B3. depict surface and subsurface structures

D. General and transferable skills:

D1. conduct appropriate scientific communication.

D2. work independently and within a team.

D3. make good use of IT knowledge.

3. Contents

Lectures 1-4	Basics of magnetic methods
Lectures 5-7	Types of magnetism
Lectures 8-10	Data acquision (field & lab)
Lectures 11-15	Data analysis
Lectures 16-20	Data interpretation
Lectures 21-28	Application of magnetic methods
Weeks 29, 30	**Assessment**

4. Teaching and Learning Methods

- Lectures
- Web search assignments
- writing reports

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 30th Week	100%

*KU: Knowledge and Understanding, I: Intellectual

6. List of references

Essential Books:

- Butler, F. B. Paleomagnetism, magnetic domains to geologic terrains. Blackwell Şci. Publ., 319p.
- Sharma, P.V., 1986. Geophysical methods in geology. Elsevier, Amsterdam, 442p.
- Nettleton, L. L., 1976. Gravity and magnetic in oil prospecting. Mc. Grow Hill Book Co. N. Y., 464p.

Recommended books

- Applied Geophysics (Telford et al.), 1992.
- Paleomagnetism, continents and oceans (McElhinny & McFadden),2000.

Periodicals, Web sites

J. Geophysical Research

Geophysical J. International.

7. Facilities required for teaching and learning

- Computer
- Data show projector
- Sophisticated licensed software

Course Coordinator		Head of Department
Name	Prof. Mohamed R. Soliman	Prof. Abdelfattah Ali Zalat
Name (Arabic)	أ.د .محمد رفعت سليمان	أ.د. عبدالفتاح على زلط
Signature	……………………………	…………………………………………
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Course contents	Course outcomes ILOs								
	Knowledge and Understanding			Intellectual			Transferable		
	A1	A2	A3	B1	B2	B3	D1	D2	D3
Basics of magnetic methods	☒	☒	☐	☐	☒	☐	☒	☒	☐
Types of magnetism	☐	☒	☒	☐	☒	☒	☐	☒	☐
Data acquision (field & lab)	☐	☐	☐	☐	☒	☒	☐	☒	☒
Data analysis	☐	☒	☒	☐	☒	☒	☐	☒	☒
Data interpretation	☒	☐	☐	☒	☐	☐	☐	☐	☒
Application of magnetic methods	☐	☒	☒	☒	☒	☐	☐	☒	☒

Learning and Teaching Methods-ILOs

Learning and Teaching Methods	Course outcomes ILOs								
	Knowledge and Understanding			Intellectual			Transferable		
	A1	A2	A3	B1	B2	B3	D1	D2	D3
Lectures	X	X	X	X			X		
Web search assignments			X			X	X	X	
Writing Reports		X			X				X

Assessment Methods-ILOs

Assessment Methods	Courses outcomes ILOs								
	Knowledge and Understanding			Intellectual			Transferable		
	A1	A2	A3	B1	B2	B3	D1	D2	D3
Written Examination	X	X	X	X	X			X	

Course Title	**Statistics**	
Course Code	**1436**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Kadry Zakaria Elsherbeny**	
Other staff		
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc. Geology**	
Course delivery	**Lecture**	**28 x 1h lectures**
	Practical	**-**
Parent Department	**Mathematics Department**	
Date of Approval	**September, 2014**	

1. Aims

This module aims to provide M. Sc. students in geology with basic concepts of study design and data analysis suitable for laboratory and field research, and to help students to develop the skills needed to apply statistical methods using related statistical software; e.g. Primer or GraphPad in scientific geological research. Emphasis will be on practical and applied skills using example of relevance to geology students.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

A5. statistical measures for data description; statistical estimation; correlations and testing hypothesis.
A6. study design.
A7. types of variables that are used in geological research.
A8. sampling variation, how to quantify the variability, and its role in comparing groups or categories.

***B. Intellectual skills**:*

B1. carry out confidently simple essential statistical methods in geological research and to interpret results.
B2. select appropriate statistical methods for analysis of simple data sets and apply them on a computer using bio-statistical software, GraphPad.
B3. summarize data using graphical and tabular data.
B4. interpret research findings and explain them in a clear, concise and logical manner.

D. Transferable skills

D4. write report including graphical material.

D5. present and discuss the finding from statistical analysis in a clear, concise and logical manner.

D6. use internet and other electronic sources as a source of information.

3. Contents

Analysis and design of research studies (one hour/week)

Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.
Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.
Lectures 27-28	Design of experiments: The null hypothesis, statistical significance and rejecting the null hypothesis.
Weeks 29, 30	**Assessment**

4. Teaching and Learning Methods

- Lectures are an integral part of course delivery in this course, supported by problems classes, tutorial groups, computational work, office hours, and individual tutorials.
- Students engage in private study in which they work through set problem sheets and individual assignments as well as assimilating lecture content.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 29^{th} Week	100%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential books

- Glantz, Stanton A. (2005): Primer of Biostatistics, 6^{th} Edition McGraw-Hill.

Recommended books

- Samuels, M. L. (1989): Statistics for the Life Sciences. Dellen Publishing Company, USA.
- Rosner, B. (1990): Fundamentals of Biostatistics. PWS-Kent Publishing Company, USA.

7. Facilities required for teaching and learning

- Projectors: video and overhead.
- Computers presentations and writing boards
- Primer or GraphPad biostatistics software.

	Course Coordinator	Head of Department
Name	Prof. Kadry Zakaria Elsherbeny	Prof. Kadry Zakaria Elsherbeny
Name (Arabic)	أ. د. قدرى زكريا الشربينى	أ. د. قدرى زكريا الشربينى
Signature	………………………………..	………………………………
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Course Contents	Course outcomes ILOs										
	Knowledge and Understanding				Intellectual				Transferable		
	A1	A2	A3	A4	B1	B2	B3	B4	D1	D2	D3
Introduction	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☐
Summarizing data	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐
Sampling variability of a mean	☒	☒	☒	☐	☒	☒	☒	☐	☒	☐	☐
Analysis of quantitative data	☒	☐	☐	☐	☒	☒	☒	☒	☒	☐	☐
ANOVA	☒	☐	☐	☐	☒	☒	☐	☒	☒	☒	☐
Sampling variability of proportions	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☐
Analysis of categorical data	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☐
Regression and correlation	☒	☒	☒	☒	☐	☐	☒	☒	☐	☒	☒
Comparing correlations and regression	☒	☒	☒	☐	☐	☐	☒	☒	☐	☒	☒
Regression and correlation	☒	☒	☒	☐	☐	☐	☒	☒	☐	☒	☒
Comparing distribution	☒	☒	☒	☐	☒	☒	☒	☒	☐	☒	☒
Comparing means	☒	☒	☒	☐	☒	☒	☒	☒	☐	☒	☐
Comparing variances	☒	☒	☒	☐	☐	☐	☐	☐	☐	☒	☒
Design of experiments	☒	☒	☒	☒	☐	☐	☐	☐	☐	☒	☒

Learning and Teaching Methods-ILOs

Learning and Teaching Methods	Course outcomes ILOs										
	Knowledge and Understanding				Intellectual				Transferable		
	A1	A2	A3	A4	B1	B2	B3	B4	D1	D2	D3
Lectures	X	X	X		X	X	X		X	X	
private study				X				X			X

Assessment Methods-ILOs

Assessment Methods	Course outcomes ILOs										
	Knowledge and Understanding				Intellectual				Transferable		
	A1	A2	A3	A4	B1	B2	B3	B4	D1	D2	D3
Written Examination	X	X	X	X	X	X					

Course Title	**Computer**	
Course Code	**1437**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Mohamed El-Awady**	
Other Staff	**Prof. Mahmoud Kamel, , Prof. Qadry Zakaria**	
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc.**	
Course Delivery	**Lecture**	**28 x 1h lectures**
	Practical	**28 x 1h practicals**
Parent Department	**Computer Centre**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to acquire a range of transferable skills that are important for post graduate M. Sc. students to:

1) Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.
2) Underpin academic work throughout postgraduate studies.
3) Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

A. Knowledge and understanding:

At the end of this module students should acquire knowledge and understanding of the underlying concepts and principles of:

1. use of IT in the context of their postgraduate studies.
2. diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.
3. necessary graphical, statistical and frequency analyses of different types of data.
4. powerful presentation using sophisticated software packages and make use of different internet resources.
5. description of scientific problems using computer programming and make use of different photo enhancing and manipulation techniques.

B. Intellectual skills:

They should also acquire the ability to:

B4. Demonstrate different application programs to develop effective information analysis and presentation.

C. Professional and practical skills:

C1. Use a number of computer packages to present information.

D. General and transferable skills:

D4. Perform the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Lectures 1-2	Methods for graphical representations, Data analysis and Data modeling
Lectures 3-4	Assignment 1 : Using Application programs Calculation of Slope and intersection of lines , Best fitting for data, Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)
Lectures 5-6	Statistical Data analysis
Lectures 7-9	Assignment 2 : Using Application programs Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data
Lectures10-11	Creating powerful presentation including charts, images, video, etc and different attractive animations
Lectures12-14	Assignment 3 : Using PowerPoint program Design a real and powerful presentation with different acquired skills
Lectures15-17	Use of internet capabilities and searching engines Assignment 4: Using the Internet Life search on the internet for some real information
Lectures18-20	Creating Data Base and related Queries and Reports Assignment 5: Using Application programs Creating a real Data Base and apply different queries and reports to extract useful information
Lectures21-23	Computer programming language Assignment 6: Programming using Visual Basic 6 Solving real problems using a computer language
Lectures24-26	Photo manipulation and enhancement using the photoshop Assignment 7: Using the Photoshop program Practicing on manipulation and enhancing of images
Lectures 27-28	Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities
Weeks 29-30	Assessment

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Assignments

The course is delivered through lectures, practical sessions and assignments. Team working skills are developed on a week-long laboratory exercises and the students present and defend their findings in a public seminar.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

	Course Coordinator	Head of Department
Name	Prof. Mohamed M. El-Awady	Prof. El-Said Taha Rizk
Name (Arabic)	أ.د. محمد محمد العوضي	أ.د. السيد طه رزق
Signature	……………………………	…………………………………
Date	/9/2014	/9/2014

Course Contents – Course ILOs Matrix

Contents	Knowledge and Understanding							Practical	Transferable	
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Methods for graphical representations	☒	☒	☐	☐				☒	☒	☐
Statistical Data analysis	☒	☒	☐	☐				☒	☒	☐
Creating powerful presentation	☒	☒	☒	☒				☒	☒	☐
Use of internet capabilities and searching engines	☒	☒	☐	☒	☒			☒	☒	☐
Creating Data Base	☒	☒	☒	☐				☒	☒	☒
Computer programming language	☒	☒	☒	☐		☒		☒	☒	☒
Photo manipulation	☒	☒	☐	☒			☒	☐	☒	☒
Introduction to Data frequency analysis	☒	☒	☐	☒		☒		☐	☒	☒

earning and Teaching Methods-ILOs

Contents	Knowledge and Understanding							Intellectual skills	Practical	Transferable
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Lectures	X	X	X	X	X		X			
Practical classes								X	X	X
Assignments						X				X

Assessment Methods-ILOs

Contents	Knowledge and Understanding							Intellectual skills	Practical	Transferable
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Lectures	X	X	X	X	X		X			
Practical Examinati on								X	X	X
Semester work						X		X		X

Course Title	Essay and Research	
Course Code	**24096**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Abdel Fattah A. Zalat**	
Other Staff	**All Geology Staff**	
Level	**Graduate-M. Sc.**	
Semester	**Two Semesters**	
Pre-Requisite		
Course Delivery	**Tutorial**	**Tutorial setting with the supervisor: 14 x 2h**
		At least once every 2 weeks
Parent Department	**Geology Department**	
Date of Approval	**September, 2014**	

1. Aims

By the end of this course, students will be able to:

13) develop geologic approaches that meet community needs considering economic, environmental, social, ethical, and safety requirements.
14) apply geologic facts and theories to analyze and interpret practical geologic data
15) collect, analyze, and present data using appropriate format and techniques.
16) postulate concepts and choose appropriate solutions to solve problems on scientific basis.
17) use effectively information technology and the software packages relevant to the geological problems.
18) adopt self and long life-learning and participate effectively in research activities.

2. Intended Learning Outcomes

A. Knowledge and understanding:

Upon successful completion of this course the students should acquire knowledge and an understanding of:

A1) theortical bases, procedures and techniques used for geological field studies and related laboratory analysis.

B. Intellectual skills:

They will also acquire the ability to:

B7. develop the capability of interpretation and analysis of geologic data.
B8. Assume a range of ideas to solve different geological problems.
B9. recognize and differentiate between the published geological data

C. Professional and practical skills:

C1. apply scientific ethics for accuracy during reporting.
C2. employ the geologic bases to meet community needs.
C3. investigate previous work and references.

D. General and transferable skills:

D13. use information and communication technology effectively.
D14. identify roles and responsibilities, and their performing manner.
D15. consider community linked problems
D16. acquire self-and long life-learning.
D17. apply scientific modles and systems effectively.
D18. deal with scientific patents considering property right.

3. Contents

This module is given over two semesters with no fixed programme. It will give students the opportunity to develop their written communication skills by being given practice at obtaining information from a variety of sources, organizing and presenting it as a cogent argument.

4. Teaching and Learning Methods

- **Small group tutorials** (1 member of staff to 1-5 students, usually following the same or related programs). 4 sessions per semester. Students tutored by different staff members in the two semesters to ensure diversity of styles and experiences. Required to write an assessed essay over the 2 semesters and to undertake preparatory work as required by the tutor.
- Students are encouraged to devote private study time to reading from a collection of general texts held in the library and to be aware of current developments via the popular scientific press.
- **Supervision**: The level of contact between students and supervisors during project work will vary across the different disciplines in the Faculty but all students are required to maintain regular contact with the supervisor. This is the student responsibility. Student should note that they are required to meet with the supervisor at least once every two weeks during the semesters to discuss progress. Student may, of course, make an appointment to see his supervisor at any time. Students who fail to make regular contact with the Supervisor will be reported to the Coordinator of Teaching. Students should remember, the supervisor is also his personal tutor with whom he should raise any issues of concern which may be affecting his work.

5. Student Assessment

There are three parts to the assessment of the project:

1. <u>Essay Structure: 5000 words (50% awarded by supervisor and second assessor): Project report in the style of a scientific paper and supervisors mark, reflecting student effort, commitment and input to project plus team-working skills where appropriate.</u>

2. Student conduct (20% awarded by supervisor): Student portfolio on the review of the literature pertinent to project area.
3. Seminar (30% awarded by supervisor and second assessor): oral presentation to peers and academic staff.

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Oral Assessment	KU, I	Assessment Session	Term Final	30%
Student portfolio	KU, I	Continuous Assessment		50%
Seminar	P, T	Assessment Session	Term Final	20%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

- Initially, students are provided with a limited number of references relating to their subject area, but then are expected to search the literature on their own.

Recommended Books:

- Day R. A. 1986: How to write and publish a scientific paper. Cambridge University Press, Fourth Edition.
- Master, PA. 1986: Science, Medicine and Technology: English grammer and technical writing. Prentice-0Hall, Inc., Engllewood Cliffs, New Jersey 07632.

Web sites:

- www.thomsonrights.com

7. Facilities required for teaching and learning

- Library
- Web Searching

	Course Coordinator	Head of Department
Name	Prof. Abdel Fattah A. Zalat	Prof. Abdel Fattah A. Zalat
Name (Arabic)	أ. د. عبد الفتاح علي زلط	أ. د. عبد الفتاح علي زلط
Signature		
Date	/9/2014	/9/2014

Postgraduate

Program and Course Specifications

Zoology

2014 - 2015

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M.Sc. Program of Ecology

1. Academic Standards:

The Academic Reference Standards (ARS) for the award of the M.Sc. degree in Ecology are designed to provide students with the knowledge and skills for proficiency in Ecological Science. The National Authority for Quality Assurance and Accreditation of Education (NAQAAE) for M.Sc. degree are used as the core of these academic standards to determine appropriate content and process skills for students. The relationship between science, our environment, and our everyday world is crucial to each student's success and should be emphasized. Science consists of a way of thinking and investigating, and includes a growing body of knowledge about the natural world. To become literate in science, therefore, students need to acquire understandings of both the Characteristics of Science and its Content.

The following Specific ARS for the M.Sc. in Ecology were approved by the Council of the Faculty of Science, Tanta University.

1.1. Graduate Attributes:

Graduate of M.Sc. Program in Ecology Should be Able to:

1.1.1-Apply the knowledge of Ecological Science and their related disciplines, applications and tools in solving scientific problems.

1.1.2-Apply the analytical methods in Ecology research.

1.1.3-Apply specialized knowledge in Ecology combined with related knowledge in professional practice.

1.1.4- Show awareness of the ongoing problems in the minor specialization.

1.1.5- Use appropriate technological resources to serve and improve the professional practice.

1.1.6- Communicate effectively and lead teams.

1.1.7- Show awareness of his/her role in community development and preservation of the environment in light of global and local changes.

1.1.8- Share in multidisciplinary team work and be flexible for adaptation and working under contradictory conditions.

1.1.9- Hold professional values that maintain individuality, positive thinking and self-confidence.

1.1.10- Collect, summarize and present data, undertake professional and ethical responsibilities.

1.2. Knowledge and Understanding:

Students analyze how scientific knowledge is developed and will understand important features of the process of scientific inquiry. By the end of the program, the M.Sc. holder must have precise knowledge in different areas and research fields in zoology and be able to:

1.2.1- Investigate the advanced knowledge and training in one or more areas of Ecology with more specific subject-related skills in one of these areas.

1.2.2- Explain the theoretical and practical knowledge of various Ecological aspects, their knowledge which are required for professional activities in the field of Ecology research career.

1.2.3- Demonstrate a comprehensive understanding of essential literature in their specific research area.
1.2.4- Define the scientific progress in the area of his/her minor specialty.
1.2.5-Write on the routine applied for interpreting and analyzing Ecological information.
1.2. 6- Illustrate the principles of ethics in scientific studies and research.

1.3. Intellectual Skills

Students will apply the following to inquiry intellectual practices:

1.3.1- Criticize approach to any Zoological and environmental problems which they may encounter.
1.3.2- Postulate and deduce mechanisms and procedures to handle scientific problems.
1.3.3-Perform perfectly the modern professional practice in the minor specialty of Zoology.
1.3.4- Apply a significant information gathering and analytical skills in an area of applied research in Zoology.
1.3.5- Develop lines of argument and appropriate judgments in accordance with the scientific theories and concepts.
1.3.6- Create plan to develop performance in the minor area of specialty.
1.3.7- Apply appropriate physical principles to create and analyze system components
1.3.8- Evaluate the risks in professional practices in the minor area of specialty.
1.3.9-Analyze and estimate knowledge in the area of minor specialty and use it in solving research problem.
1.3.10- Reconstruct the available resources effectively and develop them.
1.3.11- Differentiate between subject-related theories and assess their concepts and principles.
1.3.12- Analyze, synthesize, assess and interpret qualitatively and quantitatively science relevant data.
1.3.13- Construct several related integrated information to confirm, make evidence and test hypothesis.
1.3.14- Use theories of zoology to interpret results.

1.4. Professional and practical skills:

Students will be encountered important features of the process of scientific inquiry and by the end of the program, the M.Sc. holder must be able to:

1.4.1- Perform the skills of analytical biological information in selecting the appropriate biological instrumentations and laboratory techniques in various fields of Zoology.
1.4.2- Plane, design, conduct and report on the investigated data, using appropriate techniques and considering scientific guidance.
1.4.3- Store sufficient idea for methods of collection, classification, preservation and analysis of animal samples.
1.4.4- Apply techniques and tools considering scientific ethics.
1.4.5- Perform research in Zoological sciences and demonstrate proficiency in the techniques and methods appropriate for their research area in minor specialty.
1.4.6-Design and conduct a research project and be able to present the results to an appropriate forum both in oral and in written format.
1.4.7- Proficiently teach the laboratory sections in Zoology as well as one specialty area and able to compete positively for jobs in academic and private area.

1.4.8- Collect evidences to test and confirm the scientific hypothesis in the field of minor specialty.

1.4.9- Implant comprehensive physical knowledge and understanding as well as intellectual skills in research tasks.

1.4.10- Use the national standards for laboratory equipment which are essential for practical work.

1.5. General and Transferable Skills.

By the end of the program, the M.Sc. holder must be able to:

1.5.1- Oral and written communicate and exchange the information effectively through seminars and discussion meetings.

1.5.2- Effectively uses information and communication technology and identifies roles and responsibilities, and their performing manner.

1.5.3- Think independently, set tasks and solve problems on scientific basis.

1.5.4- Work in group effectively, manages time and communicates with others positively.

1.5.1- Consider community linked problems, ethics and traditions and acquire self- and long life–learning.

1.5.5- Deal with scientific data in Arabic, English or other languages.

1.5.6- Apply effectively scientific models, systems, , information technology, and tools and deal with scientific patents, also, exhibit the sense of beauty and neatness.

1.5.7- Fit the ethics of scientific research.

2- Curriculum Structure and Contents:

٢.1- Program duration: At least two years for the thesis preparation.

٢.2- Program Structure: Thesis in different branches of zoology.

Thesis

The thesis of M.Sc. program in Ecology is a formal written document representing sustained research into an important intellectual issue. The thesis must be an independent effort which contributes to the accumulated understanding of the field in which it is written. The required research preparation and advanced research methods courses will help the student to focus his or her research effort, and provide general guidelines for research approach and report preparation. Thesis will be reviewed and approved by the candidate's supervising professor and external academic review committee.

a. The thesis should contain the following:

- Title page (title, name of student, university, faculty, name of program, date, supervisors
- Table of contents
- Introduction, containing a definition of the thesis statement, working method, the theoretical framework, and the aim.
- Literature review.
- Materials and methods.
- Results
- Discussion and conclusions
- References.

b. Language of the thesis:

The thesis must be written in English language accompanied by a summary in Arabic.

c. Formation of Examiners Committees

A committee is selected by zoology Department Council. The M.Sc. Degree is awarded to the applicant by University, upon the recommendation of the department and the Faculty Council.

3. Program Admission Requirements:

An applicant for admission to the M.Sc. program in zoology should hold an B.Sc. degree in zoology with a minimum grade of (Good = 70%)

4- Program Student Evaluation

- Courses of pre-master academic year
- At least one published paper
- Written thesis
- Public hearing
- Defense exam

A. Program Specification

Program Title	**Master of Ecology**
Award	**Master of Ecology**
Parent Department	**Zoology Department**
Teaching Institution	**Faculty of Science - TU**
Awarding Institution	**Tanta University**
Coordinator	**Prof. Abdel Naieem I. Al-Assiuty**
External Evaluator(s)	
QAA Benchmarking Standards	**Academic Reference Standards (ARS)**
Other Reference Points	**Bioscience, Egyptian Code of Assessment**
Date of intake	**Every year in September**
Review Date	**Internal Periodic Review, Summer 2014**
Date of Approval	**September, 2014**

1. Aims

This program is designed to:
study the nature of environmental problems and methodologies of evaluation. Show basic technological environmental issues and problems on development of relevant skills in environmental analysis, planning, management and control.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this program students should be able to:

A9. Identify natural systems and processes.

A10. Mention scientific principles and skills of scientific, social, philosophical, economic, ethical, legislative and political concepts.

A11. Show a range of environmental problems and express how to improve decisions.

B. Intellectual skills:

They will also acquire the ability to:

B18. Explore effective solutions for problems involving complex information.

B19. Analyse and synthesise diverse information in a critical manner.

B20. Formulate a hypothesis, plan and execute research or development work.

B21. Evaluate the outcomes and draw valid conclusions.

C. Professional and practical skills:

C16. plan and conduct research supported by current literature, utilising relevant technologies.

C17. Undertake laboratory investigations in a responsible, safe and ethical manner.

D. General and transferable skills:

D22. Communicate about a subject clearly, confidently and effectively using a range of presentational techniques.

D23. use the internet/electronic resources to obtain subject specific information, and apply numerical and IT skills with confidence and accuracy.

D24. work with others as a part of a team to collect data and/or to produce reports and presentations

D25. study independently, set realistic targets and plan work and time to meet targets within deadlines.

3. Academic standards

3.A academic references of standards (Benchmarks):

Academic reference standards (ARS)

4. Curriculum Structure and contents:

4.A	Programme duration: one year					
4.B	Programme structure					
4.B.1	Number of contact hours		per Week:			
			Lectures	6	Lab.	6
	Overall	Contact hours	Lectures	10	Lab.	8
4.B.2	Number of contact hours		Compulsory	6	Optional	6
4.B.3	Thesis					

5. Programme courses

Year 1	Course Title	Lec.	Prac.	Program ILOs Covered
Three of the first five courses are obligatory:				
1	Freshwater Ecology	2	2	KU, I, P,T
2	Marine ecology	2	2	KU, I, P,T

3	Desert Ecology	2	2	KU, I, P,T
4	Soil biology	2	2	KU, I, P,T
5	Biostatistics	1	-	KU, I,P, T
6	Computer	1	1	KU, I, P,T

6. Programme admission requirements

The applicants must have obtained a Bachelor's degree, or its equivalent, in Zoology with a "good" degree as a minimum for approval.

7. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression:

- The programme includes one year of coursework, followed by a research project, i.e. the Master thesis, by laboratory investigation in a mentored environment.
- Assessment is held by the end of the first year, and student will be eligible only on attaining a "pass" degree (70%).
- The student who fails certain course at the first attempt will be eligible for only a "Pass" degree following only one re-set examination.
- The student can submit his thesis only after one year from the date of the Faculty Council approval on the thesis subject.

8. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Applied	
2. Alumni	Applied	
3. Stakeholders(Employers)	Applied	
4. External Evaluator(s)(External Examiner(s))	Applied	
5. student questionnaire	Applied	A questionnaire applied on courses individually

We certify that all of the information required to deliver this program is contained in the above specification and will be implemented. All course specifications for this program are in place

Name	Signature	Date
Programme Coordinator: Prof. Abdel Naieem I. Al-Assiuty (أ. د. عبد النعيم ابراهيم الأسيوطى)	…………………………	/9/2014
Head of Quality Assurance Unit: Prof. Hoda Kamal Elsayed (أ. د. هدى كمال السيد)	…………………………	/9/2014
Dean of the Faculty: Prof. Tarek Fayed (أ. د. طارق فايد)	…………………………	/9/2014

M.Sc. Courses: Programme Matrix

Programm intended learning outcomes ILOs	Academic standards intended learning outcomes ILOs																								
	Knowledge and Understanding						Intellectual skills							Practical skills						Transferable skills					
	1	2	3	4	5	6	1	2	3	4	5	6	7	1	2	3	4	5	6	1	2	3	4	5	6
A1. identify natural systems	√																								
A2. mention scientific principles	√																								
A3. show a range of environm ental problems		√																							
B1. expl ore effective solution s																									
B2. anal yse and synthesise informati		√					√						√												
B3. for mulate a hypothesi s, plan		√					√																		
C1. pla n and conduct research supported by current literature								√																	
C2. und ertake laboratory investigati ons						√									√		√								

D1. communicate about a subject clearly																			√					
D2. use the internet/electronic resources																				√				
D3. work with others as a part of a team																						√		
D4. study independently																					√			
D5. Thesis							√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Course - Programme ILOs Matrix (Curriculum Map)

Course title	Intended learning outcomes ILOs												
	KU			I				P		T			
	A1	A2	A3	B1	B2	B3	B4	C1	C2	D1	D2	D3	D4
Freshwater Ecology	√	√	√	√	√	√	√	√	√				
Marine ecology	√	√	√	√	√	√	√	√	√				
Desert Ecology	√	√	√	√	√	√	√	√	√				
Soil biology	√	√	√	√	√	√	√	√	√				
Biostatistics					√			√	√				
Computer								√		√	√	√	√

Programme coordinator:

Head of Department:

B. Course Specification

Course Title	**Freshwater Ecology**	
Course Code	**1621**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Abdel Naieem I. Al-Assiuty**	
Other Staff	**Prof. Mohamed H. Mona, Prof. Naglaa Geasa and Prof. MonaM. El-Gamal**	
Level	Preliminary students of Msc	
Semester	Continuous academic year	
Pre-Requisite		
Course Delivery	**Lecture**	**28 x 2h lectures**
	Practical	**28 x 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

Students will survey major taxonomic groups of aquatic organisms and study morphological and physiological adaptations that allow aquatic biota to occupy dilute and dynamic freshwater habitats. Although emphasis will be placed on locally indigenous species, globally significant freshwater issues will be discussed. These topics include the effects of water pollution on freshwater biota, freshwater distribution and abundance, and the future of freshwater.

2. Intended Learning outcomes

A. Knowledge and understanding:

Upon successful completion of this course the student should be able to:

A4. Describe the taxonomy, ecology and life histories of organisms that inhabit inland waters.
A5. explain how aquatic organisms are closely linked to the chemical and physical environment
A6. show the diversity of running water.
A7. mention the human impact.

B. Intellectual skills:

They will also acquire the ability to

B1. examine the interrelationships between physical and biological factors.
B2. assess the specific environmental factors and the diversity of running water.
B3. develop the process acting in running water.
B4. evaluate the human modification of the stream.

C. Professional and practical skills:

C1. detect functional and structural characteristics of river system.
C2. demostrate ecological, hydrological and geomorphological processes.

D. General and transferable skills:

D1. **Communication**: write reports including graphical material and give oral presentation. - communicate in written, verbal, graphical and visual forms.
D2. **IT skills**: - use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills and to seek and apply to suitable employment. - use a number of computer packages to present information. - use PC to write, in an acceptable format, an essay on a biological subject.
D3. **Problem solving**: - explore, analyse, and find effective solution for problem involving complex information.
D4. **Working with others**: work with other as a part of a team to collect data and/or to produce reports and presentations.
D5. **Self-learning**: - study independently, set realistic targets and plan work and time to met targets within deadlines.

3. Content

Lecture 1	Introduction and syllabus.
Lecture 2	Organic matter in lotic ecosystems
Lecture 3	Nutrient dynamics
Lecture 4	Transport and transformation of nutrients
Lecture 5	Nutrient concentration of nutrients
Lecture 6	Distributional pattern and resource partitioning
Lecture 7	Experimental studies of competition
Lecture 8	Physical factors of importance to the biota
Lecture 9	Autotrophs
Lecture 10	Heterotrophic energy sources
Lecture 11	Microobial loop

Lecture 12	Invertebrate consumers
Lecture 13	Feeding ecology of riverine fishes
Lecture 14	Lotic food web
Lecture 15	Choice and vulnerability
Lecture 16	Predator control of prey distribution and abundances
Lecture 17	Periphyton-grazer interactions
Lecture 18	Herbivory on macrophytes
Lecture 19	Grazing on lotic phytoplankton
Lecture 20	Brief history of river modification
Lecture 21	Dissolved gases
Lecture 22	Major dissolved components of river water
Lecture 23	The bicarbonate buffer system, alkalinity and hardness
Lecture 24	Fate of dissolved and particulate organic matter
Lecture 25	Organic matter budgets
Lecture 26	The river continuum concept
Lecture 27	Functional basis of drift
Lecture 28	Transformation of the lands
Assessment	Modification and running waters by humankind
Practical contents	**Practical applications are related to the above topics.**

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Internet and library research
- Writing Reports
- Assessments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	KU, I, P.T	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Essential Books:Stream ecology structure and function of running waters by J David Allan (1995)

- Recommended Books:The ecology of aquatic insects by Allan, J. D. (1984)

Periodicals, Web sites:Hydrobiologia, Oikos, Ecology.

7. Facilities required for teaching and learning

- Projectors; Video, Overhead and Slide.
- Computer Presentations and Writing Boards.
- Museum Models. - Library.

	Course Coordinator	Head of Department
Name	Prof. Abdel Naieem I. Al-Assiuty	Prof. Prof. Nabil Kamal Elfiki
Name (Arabic)	(أ. د. عبد النعيم ابراهيم الأسيوطى)	(أ. د. نبيل كمال الفقى)
Signature	………………………………..	…………………………………
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs														
	KU				I				P		T				
	A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	C 1	C 2	D 1	D 2	D 3	D 4	D 5
Introduction and syllabus.	√	√	√	√											
Organic matter in lotic ecosystems	√	√	√	√											
Nutrient dynamics	√	√	√	√											
Transport and transformation of nutrients	√	√	√	√											
Nutrient concentration of nutrients	√	√	√	√											
Distributional pattern	√	√	√	√											
Experimental studies of competition	√	√	√	√											
Physical factors of importance to the biota	√	√	√	√	√	√	√								
Autotrophs	√	√	√	√											
Heterotrophic energy sources	√	√	√	√											
Microobial loop	√	√	√	√											

Invertebrate consumers	√	√	√	√											
Feeding ecology of riverine fishes	√	√	√	√											
Lotic food web	√	√	√	√											
Choice and vulnerability	√	√	√	√											
Predator control of prey distribution and abundances	√	√	√	√											
Periphyton-grazer interactions	√	√	√	√											
Herbivory on macrophytes	√	√	√	√											
Grazing on lotic phytoplankton	√	√	√	√											
Brief history of river modification	√	√	√	√		√	√	√							
Dissolved gases	√	√	√	√											
Major dissolved components of river water	√	√	√	√		√	√								

The bicarbonate buffer system	√	√	√	√											
Fate of dissolved	√	√	√	√											
Organic matter budgets	√	√	√	√											
The river continuum concept	√	√	√	√			√								
Functional basis of drift	√	√	√	√											
Transformation of the lands	√	√	√	√											
Modification and running waters by humankind	√	√	√	√		√	√	√							
Practical applications are related to the above topics									√	√	√	√	√	√	√

Course Title	**Marine Ecology**	
Course Code	**1622**	
Academic Year	**2014/2015**	
Coordinator	**Prof.** Abdel Naieem I. Al-Assiuty	
Semester	**Continuous academic year**	
Level	**Graduate-M.Sc.**	
Other Staff		
Pre-Requisite		
Course Delivery	**Lectures 2 hours weekly**	**28 x 2h lectures**
	Practicals 2 hours weekly	**28 x 2h practicals**
	Total	**28 x 4h**
Parent Department	**Zoology Department**	
Date of Approval	**9-2014**	

1. Aims

Marine ecology is, in its broadest sense, the study of the factors that determine the distribution and abundance of marine organisms. The primary objective of Marine Ecology course is to provide a comprehensive and stimulating introduction to marine ecological concepts and processes. Also to develop the basic skills used by marine ecologists to critically analyze and evaluate scientific research, through the discussion of research papers and the development of individual research projects. The students will get familiar with the importance of the Marine environment to human beings and human impact on the seas & oceans. Laboratory will stress studies of local fauna and natural habitats in the Red Sea & Mediterranean Sea with Suez Canal.

2. Intended Learning outcomes

A. Knowledge and understanding:

On completing the course, the students will be able to:

A1. Define the fundamentals principles, concepts and terminology of Marine Ecology.

A2. mention the marine ecosystems and relationship between various marine environments and their inhabitants.

A3. describe the structure and function among marine communities.

A4. demonstrate the relationships between marine organisms;

B. Intellectual skills:

On completing the course, the students will be able to:

B1. discuss the physical and biological processes in the marine environment.

B2. demonstrate how climate interacts with the marine environment and recent changes that have occurred in our oceans due to anthropogenic influence.

C. Professional and practical skills:

On completing the course, the students will be able to:

C1. identify major groups of marine taxa, from single -celled phytoplankton through marine invertebrates (zooplankton and intertidal organisms) and vertebrates (fish, birds, and mammals).

C2. estimate the salinity and alkalinity and techniques used by biologists for sampling and experimental design,

C3.explore Coral Reefs with associated marine communities.

D. General and transferable skills:

On completing the course, the students will be able to:

D1. use computers and utilize the internet for writing scientific essays.

D2. use the electronic library & search for information in library & from the web.

D3. work effectively both in a team, and independently with Present data in oral and written presentations as Posters or ppt in seminar.

D4. solve the problems of Marine Ecology such as marine pollution & bleaching of coral reefs.

3. Contents

Lectures

Lecture 1	Introduction to Marine Ecology. Course specifications & objectives. Seas & Oceans and their relation to man.
Lecture 2	Marine environment. Characters of sea water. Division of marine environment –Pelagic region, benthic region.
Lecture 3	Unique properties of sea water – Physical properties – Salinity, temperature, light,… Chemical properties – Oxygen, hydrogen ion concentration….

Lecture 4	Effect of Physical and Chemical environment on Marine Organisms.
Lecture 5	Ecological division of Marine Organisms. Plankton, benthos, nekton.
Lecture 6	Marine Zooplankton.Holoplankton , Meroplankton. Adaptation of pelagic Organisms.
Lecture 7	Marine Zoobenthos. Main groups of Zoobenthos, Adaptation of benthic Organisms.
Lecture 8	Corals & coral reefs. Diversity of corals. Ecology and biology of hermatypic corals. Importance & threats (Anthropogenic & non- anthropogenic) of coral reefs.
Lecture 9	Biofouling. Fouling community, Prevention of Fouling .
Lecture 10	Marine borers. Wood borers, Rock borers, Coral reefs borers.
Lecture 11	Mariculture .Molluscan Mariculture, Crustacean Mariculture. Culture of other economic invertebrates.
Lecture 12	Marine pollution. Definition, Sources of pollution-Oil pollution. Effect of pollution on Marine Organisms.
Lecture 13	Associations of Marine Organisms. Symbiosis, commensalism, parasitism.
Lecture 14	Future with Marine environment. Climate change and marine communities. Coral reefs, Molluscs, crustaceans.
Practical	**(Laboratory)**
Practical 1	Introduction to laboratory Study of Marine Ecology.
Practical 2	Instruments for sampling the Marine environment.
	Water sampling – Nansen reversing water bottle, thermometer, salinometer, oxygen meter, ph meter, sechi disc.
Practical 3	Physical & chemical properties of sea water.
Practical 4	Biological sampling- Plankton net , dredges. Collection & preservation of Marine Organisms (Zooplankton & benthos).
Practical 5	Under water observation- Diving by SCUBA (Self –Contained Underwater Breathing Apparatus), Snorkeling, Glass boat, underwater photography.
Practical 6	Marine Zooplankton: Maine groups. Holoplankton , Meroplankton.
Practical 7	Marine Zoobenthos: Maine groups of Zoobenthos.
Practical 8	Diversity of corals, Field trip to coral reefs, Equipments for study coral reefs.

Practical 9	Mangroves, Fouling community.
Practical 10	Marine borers. Wood borers (bivalves, Crustaceans), coral reef borers, rock borers.
Practical 11	Mariculture. The marine aquarium.
Practical 12	Guidelines for writing an appropriate Lab Reports and research papers in Marine Ecology with presentations.
Practical 13	Paper Discussions (a journal article).
Practical 14	Practical exam.

4. Teaching and Learning Methods

- Lectures using Laptop & Data show, overhead projector and power point.
- Demonstration of Equipments for study Marine Ecology, preserved marine specimens or photographs of rare specimens, Field trip to coral reefs
- Home work (preparing an essay on specific topics related to the course & writing scientific reports) with oral presentation of essays or online research papers.

5. Student Assessment

Assessment Method	Assessment Length	Schedule	Proportion
Written Examination	3 Hour Examination	The 16th Week	60%
Oral Assessment	Assessment Session	Term Final	-
Practical Examination	2 Hour Examination	The 15th Week	40%
Semester work	Continuous Assessment		-

6. List of references

6-1 - course notes:

- Lectures notes - Authorized by Zoology Department, Faculty of Science , Tanta University, Egypt.
- Practical notes - Authorized by Zoology Department, Faculty of Science, Tanta University, Egypt.

6-2 - Essential Books:

- Charles J.R. Sheppard , Andrew Price , Callum Roberts (1992): Marine Ecology of the Arabian Region. Elsevier Science & Technology Books, 359 pp. ISBN-13: 9780126394900
- Richard Stephen Kent Barnes, R. N. Hughes (1999): Introduction to Marine

Ecology. Blackwell Publishing, 300 pp. ISBN: 9780865428348

6-3 - Recommended Books:

- Castro, P. and Huber, M. (2007): Marine Biology. 6th. ed., McGraw-Hill Higher Education, Boston, 460 PP.
- Karleskint, G. (1998) : Introduction to Marine Biology. Saunders College Publishing, USA, 378 pp.
- J. W. Nybakken, and M. D. Bertness. 2004. Marine Biology: An Ecological

Approach. 6th Edition.Benjamin Cummings and Addison Wesley Longman, Inc., San Francisco, CA. 516 pages.

- Pemert, G. and Ormond, R. (1981): Red sea coral reefs. Marine life of Saudi
- Arabia. 1st. Ed. Kegan Paul international, London, 192 pp.
- Vine, P. (1986): Red sea Invertebrales. Immel publishing, Great Britain, 50 PP.
- Wallace, C. C. (1999) :Staghorn corals of the world : A revision of the coral Genus *Acropora*. CSIRO Publishing,Australia,421 pp.
- Wickler, W. (1973): The marine aquarium. T.F.H. Publications, Inc. Ltd., U.S.A., 112 PP.

6-4 – Periodicals (journals), Web sites, etc

Search Engines

http://www.google.com & http://www.alltheweb.com
Numerous other Search Engines help students to search by keywords.
Marine Ecology (Journal)
http://www3.interscience.wiley.com/journal/

Journal of Experimental Marine Biology and Ecology

www.elsevier.com/locate/jembe

JMBA (The Marine Biological Association of the United Kingdom)
An international journal with a worldwide distribution publishing original research on all aspects of marine biology

journals.cambridge.org/jid_MBI

Marine Biology Book website: http://www.mhhe.com/castrohuber6e

Marine Biology
International Journal on Life in Oceans and Coastal Waters

www.springer.com/life+sci/ecology/journal/227

Limnology and Oceanography (Journal): *www.aslo.org/lo/*
Advances in Marine Biology, Annual Reviews of Ecology and Systematics

Journal of the Marine Biological Association of the UK

Marine Ecology Progress Series, Molecular Ecology, Oceanography and Marine Biology: An Annual Review Oecologia

Trends in Ecology and Evolution

7. Facilities required for teaching and learning

- Computer halls for Data show with laptop, video clips, films, and overhead projector & transparence sheets.

- internet and well equipped laboratory.

- Field trips, and course website.

Recommendations

1- Internet assignement with scientific Poster or ppt and Oral Presentations about specific topics related to the course. Each student will look up information on the internet. Throughout the semester, data will be gathered. Posters or ppt will be presented orally during the last scheduled lab session.

2-Course Website: The course website contains all the information present in this syllabus plus additional resources including downloadable course notes, laboratory manuals, required and supplemental readings, animations, videoclips and announcements.

	Course Coordinator	Head of Department
Name	Prof. Abdel Naieem I. Al-Assiuty	Prof. Prof. Nabil Kamal Elfiki
Name (Arabic)	أ. د. عبد النعيم الأسيوطى	(أ. د. نبيل كمال الفقى)
Signature		
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs													
	KU				I		P			T			
	A1	A2	A3	A4	B1	B2	C1	C2	C3	D1	D2	D3	D4
Introduction to Marine Ecology.	√			√									
Marine environment. Characters of sea water		√	√	√									
Unique properties of sea water – Physical properties – Salinity				√	√								
Effect of Physical and Chemical environment on Marine Organisms.			√	√	√								
Ecological division of Marine Organisms.							√						
Marine Zooplankton.			√	√			√						
Marine Zoobenthos. Main groups of Zoobenthos, Adaptation of benthic Organisms.							√						
Corals & coral reefs.							√						
Biofouling. Fouling community							√						
Marine borers. Wood borers,							√						
Mariculture							√						

.Molluscan Mariculture, Crustacean Mariculture													
Marine pollution.													
Associations of Marine Organisms.													
Future with Marine environment.						√							
(Laboratory)													
Introduction													
Instruments for sampling the Marine environment.							**√**		**√**				
Physical & chemical properties of sea water.			**√**	**√**	**√**	**√**	**√**	**√**					
Biological sampling-Plankton net , dredges.													
Under water observation-Diving by SCUBA													
Marine Zooplankton: Maine groups. Holoplankton , Meroplankton.													
Marine Zoobenthos: Maine groups of Zoobenthos.													
Diversity of corals									**√**				

Mangroves, Fouling community.													
Marine borers. Wood borers													
Mariculture. The marine aquarium.													
Guidelines for writing an appropriate Lab Reports										√	√	√	√
Paper Discussions (a journal article).										√	√	√	√

Course Title	**Desert Ecology**	
Course Code	**1623**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Mohamed A. Khalil**	
Other Staff	**Prof. Abdel Naieem I. Al-Assiuty, Prof. Hala M. Abdel Lateif Bassiony**	
Level	Preliminary of Msc	
Semester	Continuous academic year	
Pre-Requisite		
Course Delivery	**Lecture**	**28 x 3h lectures**
	Practical	**28 x 4h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**9/2014**	

1. Aims

This course provides students with an opportunity to study desert organisms in their natural habitats. The major course topics will include desert plant adaptations, desert animal adaptations and life zones of the desert. An emphasis will be placed on the ecological interrelationships found among desert organisms and the biotic factors of the desert.

2. Intended Learning outcomes

A. Knowledge and understanding:

Upon successful completion of this course the student should be able to:

A1. identify the desert biota
A2. state record the life zones of the desert.
A3. explain the ecology of desert biome.
A4. mention the behavioural adaptation of desert biota.

B. Intellectual skills:

They will also acquire the ability to

B1. analyze the effect of environmental changes on desert organisms.
B2. predict the solution for problems facing desert animals.

C. Professional and practical skills:

C1. explain incorporated examples of desert biota
C2. observe common features of desert fauna
C3. observe the structure of some typical desert communities
C4. recognize the morphological adaptation of desert organisms

D. General and transferable skills:

D1. **Communication**: write reports including graphical material and give oral presentation. - communicate in written, verbal, graphical and visual forms.

D2. **IT skills**: - use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills and to seek and apply to suitable employment. - use a number of computer packages to present information. - use PC to write, in an acceptable format, an essay on a biological subject.

D3. **Problem solving**: - explore, analyse, and find effective solution for problem involving complex information.

D4. **Working with others**: work with other as a part of a team to collect data and/or to produce reports and presentations.

D5. **Self-learning**: - study independently, set realistic targets and plan work and time to met targets within deadlines.

3. Content

Lecture 1	Introduction and syllabus.
Lecture 2	The desert environment: Radiation, heat and temperature.
Lecture 3	The desert environment: wind and water.
Lecture 4	The desert environment: Nutrition.
Lecture 5	Escape from the desert environment: Ephemerality and micro-climate exploitation in plants.
Lecture 6	Escape from the desert environment: Diapause and temporary pond inhabitants.
Lecture 7	Escape from the desert environment: Aestivation.
Lecture 8	Escape from the desert environment: seasonal migration.
Lecture 9	Escape from the desert environment: retreat.
Lecture 10	Tolerance of the desert environment: I-Morphological adaptation in plant and animals
Lecture 11	Tolerance of the desert environment: Morphological adaptation a- Arthropod cuticle
Lecture 12	b- Vertebrate integument and pelage
Lecture 13	c- Animal colour
Lecture 14	d- water storage, ectopic storage of fat
Lecture 15	e- shape and size

Lecture 16	Tolerance of the desert environment: II- Physiological and behavioural adaptations
Lecture 17	Tolerance of tissue to high temperature
Lecture 18	Tolerance of dehydration
Lecture 19	Cold tolerance, adaptative heterothermy
Lecture 20	Behavioural thermoregulation
Lecture 21	Osmoregulation in arthropods and in desert vertebrates
Lecture 22	Specialization respiration and transpiration, imbibition of fog and water vapour
Lecture 23	Reproduction in desert environment
Lecture 24	Structure of some typical desert communities: Namib desert, south Amrican coastal desert,
Lecture 25	Structure of some typical desert communities: The Sahra, Central Asia, North America deserts
Lecture 26	Functional aspects of desert communities: Production, limiting factor,
Lecture 27	Functional aspects of desert communities: Decomposition, rates of energy and nutrient cycling. Population dynamics and evolution of predator-pry interaction.
Lecture 28	Man and the desert
Assessm.	
Practical part	**The practical sessions are related to the above topics.**

4. Teaching and Learning Methods

- Lectures - Practical classes

- Internet and library research

- Writing Reports - Assessments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential Books:

Louw G. and Seely M. Ecology of Desert Organisms. London, UK: Longram, 1982.

Recommended Books:Effects of solar radiation on the sensible heat exchange of mammals. Hutchinson, J. C. D., Brown, G.D. and Allen, T.E.

Periodicals, Web sites:

7. Facilities required for teaching and learning

- Projectors; Video, Overhead and Slide.
- Computer Presentations and Writing Boards.
- Museum Models.
- Library.

	Course Coordinator	Head of Department
Name	Prof. Mohamed A. Khalil	Prof. Prof. Nabil Kamal Elfiki
Name (Arabic)	(أ. د. محمد أحمد خليل)	(أ. د. نبيل كمال الفقى)
Signature	…………………………..	…………………………
Date	9/2014	9/2014

Course title	Intended learning outcomes ILOs														
	KU				**I**		**P**				**T**				
	A 1	**A 2**	**A 3**	**A 4**	**B 1**	**B 2**	**C 1**	**C 2**	**C 3**	**C 4**	**D 1**	**D 2**	**D 3**	**D 4**	**D 5**
Introduction and syllabus.	√														
The desert environment: Radiation, heat and temperature.	√														
The desert environment: wind and water.	√				√	√									
The desert environment: Nutrition.	√				√	√									
Escape from the desert environment: Ephemerality and micro-climate exploitation in plants.	√				√	√									
Escape from the desert environment: Diapause and temporary pond inhabitants.	√				√	√									
Escape from the desert environment: Aestivation.	√				√	√									
Escape from the desert environment:	√				√	√									

seasonal migration.															
Escape from the desert environment: retreat.	√				√	√									
Tolerance of the desert environment: I- Morphological adaptation in plant and animals	√	√			√	√									
Tolerance of the desert environment: Morphological adaptation a- Arthropod cuticle	√	√													
b- Vertebrate integument and pelage	√	√													
c- Animal colour	√	√													
d- water storage, ectopic storage of fat			√												
e- shape and size			√												
Tolerance of the desert environment: II- Physiological and behavioural			√	√											

adaptations															
Tolerance of tissue to high temperature			√	√											
Tolerance of dehydration			√	√											
Cold tolerance, adaptative heterothermy			√	√											
Behavioural thermoregula tion					√										
Osmoregulati on in arthropods and in desert vertebrates					√										
Specialization respiration and transpiration					√										
Reproduction in desert environment					√										
Structure of some typical desert communities															
Structure of some typical desert communities: The Sahra, Central Asia, North America deserts															

Functional aspects of desert communities: Production, limiting factor,															
Functional aspects of desert communities: Decomposition, rates of energy and nutrient cycling. Population dynamics and evolution of predator-pery interaction.															
Man and the desert															
The practical sessions are related to the above topics							√	√	√	√	√	√	√	√	√

Course Title	**Soil Biology**	
Course Code	**1624**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Abdel Naieem I. Al-Assiuty**	
Other Staff	**Prof. Mohamed A. Khalil, Prof. Hala M. Abdel Lateif Bassiony**	
Level	Preliminary of Msc	
Semester	Continuous academic year	
Pre-Requisite		
Course Delivery	**Lecture**	**28 x 2h lectures**
	Practical	**28 x 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

The course aims at conveying a deeper understanding of soil organisms and their interactions with the abiotic and biotic environment of the soil in agricultural and forest ecosystems.

2. Intended Learning outcomes

A. Knowledge and understanding:

Upon successful completion of this course the student should be able to:

- A1. mention the role of soil organisms in decomposition processes, plant nutrition, nutrient leaching and biogeochemical fluxes
- A2. explain carbon and nitrogen cycling in the plant/soil system
- A3. show biological differences between soils in different ecosystems
- A4. describe basic biology and trophic strategies of fungi, bacteria and soil animals

B. Intellectual skills:

They will also acquire the ability to

- B1. analyze the effects of environmental changes on soil organisms and the consequences for carbon and nutrient cycling.

B2. explore, analyze, and find effective solution for problem involving complex information

C. Professional and practical skills:

C1. use recent changes in the classification system and soil taxonomy.
C2. explain incorporated examples of soil contamination.
C3. observe common features of the soil.
C4. illustrate how soils can be best managed.

D. General and transferable skills:

D1. **Communication**: write reports including graphical material and give oral presentation. - communicate in written, verbal, graphical and visual forms.
D2. **IT skills**: - use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills and to seek and apply to suitable employment. - use a number of computer packages to present information. - use PC to write, in an acceptable format, an essay on a biological subject.
D3. **Prpblem solving**: - **Working with others**: work with other as a part of a team to collect data and/or to produce reports and presentations.
D4. **Self-learning**: - study independently, set realistic targets and plan work and time to met targets within deadlines.

3. Content

Lecture 1	Introduction and syllabus.
Lecture 2	The soil environment: minerals and organic composition of the soil
Lecture 3	soil temperature, soil moisture, soil atmosphere and light
Lecture 4	Soil-forming processes and soil types, soil classification
Lecture 5	Mull and Mor
Lecture 6	Grassland soils
Lecture 7	Vegetation and soil types
Lecture 8	Classification of soil fauna: body size, presence, habitat preference and activity
Lecture 9	Protozoa, acoelomata and pseudocoelomata
Lecture 10	Annelides and Mollusca
Lecture 11	Onchyophora, crustace
Lecture 12	Myriapoda and tardigrada
Lecture 13	Insecta

Lecture 14	Arachnida
Lecture 15	vertebrates
Lecture 16	The regulation of population size: Theory and practice, natality and mortality
Lecture 17	Population regulation
Lecture 18	The character of the soil community: natural associations of species
Lecture 19	The fauna of grassland soil
Lecture 20	The fauna of woodland and forest
Lecture 21	The fauna of grassland and forest soil compared
Lecture 22	The effect of pesticides on the character of the soil fauna
Lecture 23	The functional character of soil community
Lecture 24	Primary production and nutrient cycling
Lecture 25	Energetic of the detritivore/decomposer food chain
Lecture 26	Energetic of the detritivore/carnivore food chain
Lecture 27	Extraction techniques of soil animals
Lecture 28	Preservation and identification of soil animals
Assessm.	
Practical part	**The content of practical is related to the above topics**

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Internet and library research
- Writing Reports
- Assessments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

Essential Books:

- Nyle C. Brady, The nature and properities of soils. Macmillan, Publishing Com.1990

Recommended Books

- John A. Wallwork. Ecology of soil animals

Periodicals, Web sites:

Pedobiologia,

European journal of soil biology

Applied soil ecology

7. Facilities required for teaching and learning

- Projectors; Video, Overhead and Slide.
- Computer Presentations and Writing Boards.
- Museum Models.
- Library.

	Course Coordinator	Head of Department
Name	Prof. Abdel Naieem I. Al-Assiuty	Prof. Prof. Nabil Kamal Elfiki
Name (Arabic)	(أ. د. عبد النعيم ابراهيم الأسيوطى)	(أ. د. نبيل كمال الفقى)
Signature	………………………………..	…………………………………..
Date	9/2014	9/2014

Course title	Intended learning outcomes ILOs													
	KU				I		P				T			
	A 1	A 2	A 3	A 4	B 1	B 2	C 1	C 2	C 3	C 4	D 1	D 2	D 3	D 4
Introduction and syllabus.														
The soil environment: minerals and organic composition of the soil			√	√										
soil temperature, soil moisture, soil atmosphere and light			√	√	√	√								
Soil-forming processes and soil types, soil classification			√	√	√	√								
Mull and Mor			√	√	√	√								
Grassland soils					√	√								
Vegetation and soil types			√		√	√								
Classification of soil fauna: body size, presence, habitat preference and activity	√				√	√								
Protozoa, acoelomata and pseudocoelomata	√				√	√								
Annelides and Mollusca	√	√			√	√								
Onchyophora,	√	√												

crustace														
Myriapoda and tardigrada	√	√												
Insecta	√	√												
Arachnida			√											
vertebrates			√											
The regulation of population size: Theory and practice, natality and mortality			√	√										
Population regulation			√	√										
The character of the soil community: natural associations of species			√	√										
The fauna of grassland soil			√	√										
The fauna of woodland and forest					√									
The fauna of grassland and forest soil compared					√									
The effect of pesticides on the character of the soil fauna					√									
The functional character of soil community					√									

Primary production and nutrient cycling			√	√										
Energetic of the detritivore/decomposer food chain			√	√										
Energetic of the detritivore/carnivore food chain			√	√										
Extraction techniques of soil animals							√	√	√	√				
Preservation and identification of soil animals							√	√	√	√				
Practical part							√	√	√	√	√	√	√	√

Course Title	**Biostatistics**	
Course Code	**1628**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Abd-Elmoneim Anwar Mohamed**	
Other staff		
Level	**Prepararotory level of MSc**	
Semester	Continuous academic year	
Pre-Requisite		
Course delivery	**Lecture**	**28 x 1h lectures**
	Practical	**-**
Parent Department	**Mathematics Department**	
Date of Approval	**9/2014**	

1. Aims

This module aims to provide M. Sc. students in biology with basic concepts of study design and data analysis suitable for laboratory and field research, and to help students to develop the skills needed to apply statistical methods using related statistical software; e.g. Primer or GraphPad in scientific biological research. Emphasis will be on practical and applied skills using example of relevance to biology students.

2. Intended Learning outcomes

A. Knowledge and understanding:

By the end of this course the students should be able to*:*

- A9. raise students' consciousness concerning basic statistical issues such as statistical measures for data description; statistical estimation; correlations and testing hypothesis.
- A10. understand the basic principles of study design.
- A11. describe the types of variables that are used in biological research.
- A12. appreciate the role of sampling variation, how to quantify the variability, and its role in comparing groups or categories.

B. Intellectual skills*:*

- B5. carry out confidently simple essential statistical methods in biological research and to interpret results.

B6. select appropriate statistical methods for analysis of simple data sets and apply them on a computer using bio-statistical software, GraphPad.

B7. summarise data using graphical and tabular data.

B8. interpret research findings and explain them in a clear, concise and logical manner.

C. Professional and practical skills

C4. select and apply appropriate basic statistical methods for analysis of data.

C5. use GraphPad package in data analysis.

C6. tackle skills in handling data on a computer and otherwise, and deriving and presenting quantitative results using appropriate tables, figures, and summaries.

D. Transferable skills

D7. write report including graphical material.

D8. present and discuss the finding from statistical analysis in a clear, concise and logical manner.

D9. use internet and other electronic sources as a source of information.

3. Contents

Analysis and design of research studies (two hours/week)

Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.
Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.

Lectures 27-28 Design of experiments: The null hypothesis, statistical significance and rejecting the null hypothesis.

Lectures 29-30 Revision

Weeks 31, 32 **Assessment**

4. Teaching and Learning Methods

- Lectures are an integral part of course delivery in this course, supported by problems classes, tutorial groups, computational work, office hours, and individual tutorials.
- Students engage in private study in which they work through set problem sheets and individual assignments as well as assimilating lecture content.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 16th Week	90%
Oral Assessment	KU, I	Assessment Session	Term Final	5%
Semester work	KU, I	Continuous Assessment		5%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential books

- Glantz, Stanton A. (2005): Primer of Biostatistics, 6th Edition McGraw-Hill.

Recommended books

- Samuels, M. L. (1989): Statistics for the Life Sciences. Dellen Publishing Company, USA.
- Rosner, B. (1990): Fundamentals of Biostatistics. PWS-Kent Publishing Company, USA.

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computers Presentations and Writing Boards
- Primer or GraphPad biostatistics software.
-

	Course Coordinator	Head of Department
Name	Prof. Abd-Elmoneim A. Mohamed	Prof. . **Qadry Zakaria**
Name (Arabic)	أ. د. عبد المنعم محمد طعيمه	أ. د. قدرى زكريا
Signature		
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs													
	KU				I				P			T		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3
Introduction	√	√	√	√										
Summarizing data.	√	√	√	√										
Sampling variability of a mean.	√	√	√	√										
Analysis of quantitative data	√	√	√	√										
ANOVA	√	√	√	√	√	√	√	√						
Examination	√	√	√	√										
Sampling variability of proportions	√	√	√	√										
Analysis of categorical data	√	√	√	√		√								
Regression and correlation.	√	√	√	√										
Comparing correlations and regression.	√	√	√	√										
Regression and correlation	√	√	√	√					√	√	√	√	√	√
Comparing distribution	√	√	√	√					√	√	√	√	√	√
Comparing means	√	√	√	√					√	√	√	√	√	√
Comparing variances.	√	√	√	√					√	√	√	√	√	√

Course Title	**Computer**	
Course Code	1627	
Academic Year	**2014/2015**	
Coordinator	**Prof. Mohamed El-Awady**	
Other Staff	**Prof. Mahmoud Kamel, Prof. Ahmed El-Shishtawy, Prof. Qadry Zakaria**	
Semester	Continuous academic year	
Pre-Requisite		
Course Delivery	**Lecture**	**28 x 1h lectures**
	Practical	**28 x 1h practicals**
Parent Department	**Computer Centre**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to acquire a range of transferable skills that are important for post graduate M. Sc. students to:

- Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.
- Underpin academic work throughout postgraduate studies.
- Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

A. Knowledge and understanding:

Upon successful completion of this course the students should be able to:

A1. Demonstrate knowledge and understanding of the use of IT in the context of their postgraduate studies.
A2. Know the diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.
A3. Carry out necessary graphical, statistical and frequency analyses of different types of data.
A4. Create powerful presentation using sophisticated software packages.
A5. Make use of different internet resources.
A6. Solve scientific problems using computer programming.
A7. Make use of different photo enhancing and manipulation techniques.

B. Intellectual skills:

They should also acquire the ability to:

B1. Integrate different application programs to develop effective information analysis and presentation.

C. Professional and practical skills:

C1. Use a number of computer packages to present information.

D. General and transferable skills:

D1. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Lectures 1-2	Methods for graphical representations, Data analysis and Data modeling
	Assignment 1 : **Using Application programs**
	Calculation of Slope and intersection of lines ,
	Best fitting for data,
	Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)
Lectures 3-5	Statistical Data analysis
	Assignment 2 : **Using Application programs**
	Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data
Lecture 6-7	Creating powerful presentation including charts, images, video, etc and different attractive animations
	Assignment 3 : **Using PowerPoint program**
	Design a real and powerful presentation with different acquired skills
Lecture 8-9	Use of internet capabilities and searching engines

	Assignment 4: Using the Internet
	Life search on the internet for some real information
Lecture 10-11	Creating Data Base and related Queries and Reports
	Assignment 5: Using Application programs
	Creating a real Data Base and apply different queries and reports to extract useful information
Lecture 12-13	Computer programming language
	Assignment 6: Programming using Visual Basic 6
	Solving real problems using a computer language
Lecture 14-15	Photo manipulation and enhancement using the photoshop
	Assignment 7: **Using the Photoshop program**
	Practicing on manipulation and enhancing of images
Lectures 16	Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Assignments

The course is delivered through lectures, practical sessions and assignments. Team working skills are developed on a week-long laboratory exercises and the students present and defend their findings in a public seminar.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

7. Facilities required for teaching and learning

- Projectors; Video and Overhead

- LCD screens and writing Boards

- Commercial computer scientific software packages.

Course Coordinator		Head of Department
Name	Prof. Mohamed M. El-Awady	Prof. Elsayed Taha Eizq
Name (Arabic)	أ.د.محمد العوضي	أ.د. السيد طه رزق
Signature		
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs									
	KU							I	P	T
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Methods for graphical representations, Data analysis and Data modeling										
Assignment 1 : Using Application programs Calculation of Slope and intersection of lines , Best fitting for data, Extracting Trend , and Equations for acquired data (linear –exponential-logarithmic ….etc)	√	√	√	√	√	√	√			
Statistical Data analysis	√	√	√	√	√	√	√	√		
Assignment 2 : Using Application programs Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data	√	√	√	√	√	√	√	√		
Creating powerful presentation including charts, images, video, etc and different attractive animations	√	√	√	√	√	√	√			
Assignment 3 : **Using PowerPoint program** Design a real and powerful presentation with different acquired skills	√	√	√	√	√	√	√		√	
Use of internet capabilities	√	√	√	√	√	√	√			√

and searching engines										
Assignment 4: Using the Internet Life search on the internet for some real information	√	√	√	√	√	√	√			√
Creating Data Base and related Queries and Reports	√	√	√	√	√	√	√			
Assignment 5: Using Application programs Creating a real Data Base and apply different queries and reports to extract useful information	√	√	√	√	√	√	√			
Computer programming language	√	√	√	√	√	√	√			
Assignment 6: Programming using Visual Basic 6 Solving real problems using a computer language	√	√	√	√	√	√	√			
Photo manipulation and enhancement using the photoshop	√	√	√	√	√	√	√			
Assignment 7: **Using the Photoshop program** Practicing on manipulation and enhancing of images	√	√	√	√	√	√	√			

M.Sc. Program
of
Experimental Zoology

1. Academic Standards:

The Academic Reference Standards (ARS) for the award of the M.Sc. degree in Experimental Zoology are designed to provide students with the knowledge and skills for proficiency in Zoological Science. The National Authority for Quality Assurance and Accreditation of Education (NAQAAE) for M.Sc. degree is used as the core of this academic standards to determine appropriate content and process skills for students. The relationship between science, our environment, and our everyday world is crucial to each student's success and should be emphasized. Science consists of a way of thinking and investigating, and includes a growing body of knowledge about the natural world. To become literate in science, therefore, students need to acquire understandings of both the Characteristics of Science and its Content.

The following Specific ARS for the M.Sc. in Experimental Zoology were approved by the Council of the Faculty of Science, Tanta University.

1.1. Graduate Attributes:

Graduate of M.Sc. Program in Experimental Zoology Should be Able to:

- 1.1.1-Apply the knowledge of Zoological Science and their related disciplines, applications and tools in solving scientific problems.
- 1.1.2-Apply the analytical methods in Zoology research.
- 1.1.3-Apply specialized knowledge in Zoology combined with related knowledge in professional practice.
- 1.1.4- Show awareness of the ongoing problems in the minor specialization.
- 1.1.5- Use appropriate technological resources to serve and improve the professional practice.
- 1.1.6- Communicate effectively and lead teams.
- 1.1.7- Show awareness of his/her role in community development and preservation of the environment in light of global and local changes.
- 1.1.8- Share in multidisciplinary team work and be flexible for adaptation and working under contradictory conditions.
- 1.1.9- Hold professional values that maintain individuality, positive thinking and self-confidence.
- 1.1.10- Collect, summarize and present data, undertake professional and ethical responsibilities.

1.2. Knowledge and Understanding:

Students analyze how scientific knowledge is developed and will understand important features of the process of scientific inquiry. By the end of the program, the M.Sc. holder must have precise knowledge in different areas and research fields in zoology and be able to:

- 1.2.1- Investigate the advanced knowledge and training in one or more areas of Zoology with more specific subject-related skills in one of these areas.

1.2.2- Explain the theoretical and practical knowledge of various Zoological aspects, their knowledge which are required for professional activities in the field of Zoology research career.
1.2.3- Demonstrate a comprehensive understanding of essential literature in their specific research area.
1.2.4- Define the scientific progress in the area of his/her minor specialty.
1.2.5-Write on the routine applied for interpreting and analyzing Zoological information.
1.2. 6- Illustrate the principles of ethics in scientific studies and research.

1.3. Intellectual Skills

Students will apply the following to inquiry intellectual practices:

1.3.1- Criticize approach to any Zoological and environmental problems which they may encounter.
1.3.2- Postulate and deduce mechanisms and procedures to handle scientific problems.
1.3.3-Perform perfectly the modern professional practice in the minor specialty of Zoology.
1.3.4- Apply a significant information gathering and analytical skills in an area of applied research in Zoology.
1.3.5- Develop lines of argument and appropriate judgments in accordance with the scientific theories and concepts.
1.3.6- Create plan to develop performance in the minor area of specialty.
1.3.7- Apply appropriate physical principles to create and analyze system components
1.3.8- Evaluate the risks in professional practices in the minor area of specialty.
1.3.9-Analyze and estimate knowledge in the area of minor specialty and use it in solving research problem.
1.3.10- Reconstruct the available resources effectively and develop them.
1.3.11- Differentiate between subject-related theories and assess their concepts and principles.
1.3.12- Analyze, synthesize, assess and interpret qualitatively and quantitatively science relevant data.
1.3.13- Construct several related integrated information to confirm, make evidence and test hypothesis.
1.3.14- Use theories of zoology to interpret results.

1.4. Professional and practical skills:

Students will be encountered important features of the process of scientific inquiry and by the end of the program, the M.Sc. holder must be able to:

1.4.1- Perform the skills of analytical biological information in selecting the appropriate biological instrumentations and laboratory techniques in various fields of Zoology.
1.4.2- Plane, design, conduct and report on the investigated data, using appropriate techniques and considering scientific guidance.
1.4.3- Store sufficient idea for methods of collection, classification, preservation and analysis of animal samples.

1.4.4- Apply techniques and tools considering scientific ethics.

1.4.5- Perform research in Zoological sciences and demonstrate proficiency in the techniques and methods appropriate for their research area in minor specialty.

1.4.6-Design and conduct a research project and be able to present the results to an appropriate forum both in oral and in written format.

1.4.7- Proficiently teach the laboratory sections in Zoology as well as one specialty area and able to compete positively for jobs in academic and private area.

1.4.8- Collect evidences to test and confirm the scientific hypothesis in the field of minor specialty.

1.4.9- Implant comprehensive physical knowledge and understanding as well as intellectual skills in research tasks.

1.4.10- Use the national standards for laboratory equipment which are essential for practical work.

1.5. General and Transferable Skills.

By the end of the program, the M.Sc. holder must be able to:

1.5.1- Oral and written communicate and exchange the information effectively through seminars and discussion meetings.

1.5.2- Effectively use information and communication technology and identify roles and responsibilities, and their performing manner.

1.5.3- Think independently, set tasks and solve problems on scientific basis.

1.5.4- Work in group effectively, manage time and communicate with others positively.

1.5.1- Consider community linked problems, ethics and traditions and acquire self- and long life–learning.

1.5.5- Deal with scientific data in Arabic, English or other languages.

1.5.6- Apply effectively scientific models, systems, , information technology, and tools and deal with scientific patents, also, exhibit the sense of beauty and neatness.

1.5.7- Fit the ethics of scientific research.

2- Curriculum Structure and Contents:

٢.1- Program duration: At least two years for the thesis preparation.

٢.2- Program Structure: Thesis in different branches of zoology.

Thesis

The thesis of M.Sc. program in Zoology is a formal written document representing sustained research into an important intellectual issue. The thesis must be an independent effort which contributes to the accumulated understanding of the field in which it is written. The required research preparation and advanced research methods courses will help the student to focus his or her research effort, and provide general guidelines for research approach and report preparation. Thesis will be reviewed and approved by the candidate's supervising professor and external academic review committee.

a. The thesis should contain the following:

- Title page (title, name of student, university, faculty, name of program, date, supervisors
- Table of contents
- Introduction, containing a definition of the thesis statement, working method, the theoretical framework, and the aim.
- Literature review.
- Materials and methods.
- Results
- Discussion and conclusions
- References.

b. Language of the thesis:

The thesis must be written in English language accompanied by a summary in Arabic.

c. Formation of Examiners Committees

A committee is selected by zoology Department Council. The M.Sc. Degree is awarded to the applicant by University, upon the recommendation of the department and the Faculty Council.

3- Program Admission Requirements:

An applicant for admission to the M.Sc. program in zoology should hold an B.Sc. degree in zoology with a minimum grade of (Good = 70%)

4- Program Student Evaluation

- Courses of pre-master academic year
- At least one published paper
- Written thesis
- Public hearing
- Defense exam

A. Program Specification

Program Title	**Master of Experimental Zoology**
Award	**Master of Experimental Zoology**
Parent Department	**Zoology Department**
Teaching Institution	**Faculty of Science - TU**
Awarding Institution	**Tanta University**
Coordinator	**Prof. Nabil Kamal Elfiki**
External Evaluator(s)	**applied**
QAA Benchmarking Standards	**Academic Reference Standards (ARS)**
Other Reference Points	**Bioscience, Egyptian Code of Assessment**
Date of intake	**Every year in September**
Review Date	**Internal Periodic Review, Summer 2014**
Date of Approval	**September, 2014**

1. Aims

- To obtain broad, basic knowledge in the subject matter of this and related fields, with an emphasis on histochemistry, genetics, experimental embryology, immunology and radiobiology.
- To develop practical skills associated with experimental zoology research methods and an understanding of how they can be used by the student for completion of original research, which should provide a significant contribution to knowledge.
- To enable the acquisition of a comprehensive range of transferable skills.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this program the student will be able to:

A12. explain the information provided by biological staining-dyes, and the principles and application of histochemical techniques, immunohistochemical/immunofluorescence techniques and electron microscopy.

A13. show the molecular bases of inheritance as well as the different principles and methods underpinning recombinant DNA technology and its application for human welfare.

A14. describe embryology and the experimental systems for studying early embryonic development.

A15. mention the immune system, the associated molecular genetic processes and how these events relate to the production of an effective immune system.

A16. enumerate the various types and sources of ionizing radiation and their biological impact on living tissue at the molecular DNA, cellular, organ and whole body levels.

B. Intellectual skills:

They will also acquire the ability to:

B22. formulate a hypothesis, plan and execute laboratory investigation, evaluate the outcomes and draw valid conclusions.

B23. address selected contemporary issues related to zoological sciences.

B24. assess critically the literature related to subjects under study.

B25. integrate theory and practice.

C. Professional and practical skills:

C18. plan and conduct research supported by current literature, utilising relevant technologies.

C19. undertake laboratory work in a responsible, safe and ethical manner.

D. General and transferable skills:

D26. communicate about a subject clearly, confidently and effectively using a range of presentational techniques.

D27. apply numerical and IT skills with confidence and accuracy.

D28. work both independently and in collaboration with others.

D29. take responsibility for self-managed learning and personal/professional development.

3. Academic standards

3.A academic references of standards (Benchmarks):

Academic reference standards (ARS)

4. Curriculum Structure and contents:

4.A	Programme durationr: one year					
4.B	Programme structure					
4.B.1	Number of contact hours		per Week:			
			Lectures	6	Lab.	6
	Overall	Contact hours	Lectures	10	Lab.	9
4.B.2	Number of contact hours		Compulsory	6	Optional	6
4.B.3	Thesis					

5. Programme courses

Year 1	Course Title	Lec.	Prac.	Program ILOs Covered
Three of the first five courses are obligatory:				
1	Histochemistry	2	2	KU, I, P,T
2	Radiobiology	2	2	KU, I, P,T
3	Genetics	2	2	KU, I, P,T
4	Experimental embryology	2	2	KU, I, P,T
5	Immunology	2	2	KU, I, P,T
6	Biostatistics	1	0	KU, I,P, T
7	computer	1	1	KU, I, P,T

6. Programme admission requirements

Candidates must satisfy the general admission requirements of the University and Faculty in Biology and also hold B. Sc. in Zoology or its equivalent, with a “good” degree as a minimum for approval.

7. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression:

- The programme includes one year of coursework, followed by laboratory investigation in a mentored environment.

- Assessment is held by the end of the first year, and student will be eligible only on attaining a “pass” degree (60%).

- The student who fails certain course at the first attempt will be eligible for only a “Pass” degree following only one re-set examination.

- The student can submit his thesis only after one year from the date of the Faculty Council approval on the thesis subject.

8. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Not applied yet	
2. Alumni	Not applied yet	
3. Stakeholders(Employers)	Not applied yet	
4. External Evaluator(s)(External Examiner(s))	applied	
5. student questionnaire	applied	A questionnaire applied on courses individually

We certify that all of the information required to deliver this programme is contained in the above specification and will be implemented. All course specifications for this program are in place

Name	Signature	Date
Programme Coordinator: Prof. Nabil Kamal Elfiki (أ. د. نبيل كمال الفقى)	……..……..……….…………	/9/2014
Head of Quality Assurance Unit: Hoda Kamal Elsayed (أ. د. هدى كمال السيد)	……..……..……….…………	/9/2014
Dean of the Faculty: Prof. Tarek Fayed (أ. د. طارق فايد)	……..……..……….…………	/9/2014

M.Sc. Courses: Programme Matrix

Programme Title: Master of Science (M.Sc.) degree in Expermintal Zoology

Programm intended learning outcomes ILOs	Academic standards intended learning outcomes ILOs																			
	KU						I							P		T				
	A 1	A 2	A 3	A 4	A 5	A 6	B 1	B 2	B 3	B 4	B 5	B 6	B 7	C 1	C 2	D 1	D 2	D 3	D 4	D 5
A1. explain the information provided by biological staining-dyes		√																		
A2. show the molecular bases of inheritance																				
A3. describe embryology and the experimental systems																				
A4. mention the immune system.																				
A5. enumerate the various types and sources of ionizing radiation																				
B1. formulate a hypothesis, plan and execute laboratory investigation							√													
B2. address selected contemporary issues related to zoological sciences.	√																			
B3. assess critically the literature.								√												
B4. integrate theory and practice.											√									
C1. plan and conduct research supported														√	√					

C2. undertake laboratory work in a responsible															√					
D1. communicate about a subject clearly																	√			
D2. apply numerical and IT skills with confidence and accuracy																		√		
D3. work both independently and in collaboration with others.																			√	
D4. take responsibility for self-managed learning																				

Course - Programme ILOs Matrix (Curriculum Map)

Course title	Intended learning outcomes ILOs														
	KU					I				P		T			
	A 1	A 2	A 3	A 4	A 5	B 1	B 2	B 3	B 4	C 1	C 2	D 1	D 2	D 3	D 4
Histochemistry	√						√	√		√	√				
Genetics		√					√	√		√	√				
Experimental embryology			√				√	√		√	√				
Immunology				√	√		√	√		√	√				
Biostatistics						√		√							
computer								√				√	√	√	√

Course Title	**Histochemistry**	
Course Code	**1611**	
Academic Year	**2014/2015**	
Coordinator	**Prof.Dr Nabila Ibrahim El-Desouki**	
Other Staff	**Prof.Dr Ahlam Said Abo Shafey; Prof.Dr Ahmed Abdel Naim Masoud; Ihab Mostafa Tosson**	
Level	Preliminary students of Msc	
Semester	Continuous academic year	
Pre-Requisite		
Course Delivery	**Lecture**	**28 x 2h lectures**
	Practical	**28 x 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**September 2014**	

Aims

To develop theoretical and understanding of the chemical information provided by biological staining-dyes, histochemical procedures enzymes and antibodies. It will provide information on normal & abnormal aspects of organ histology and the application of histochemical techniques, immunohistochemical/immunofluorescence techniques and electron microscopy. To provide practical skills of biological tissue preparation for microscopic examination, to apply different methods to gain different types of morphological information. This module should provide an opportunity to students understand the methods applied to develop practical skills in diverse histochemical staining procedures – dye, enzymes & antibodies, and to create an understanding of the more specialized techniques used in cellular and histopathology.

2. Intended Learning Outcomes

Upon successful completion of this course students should be able to:

A. Knowledge and understanding:

A1. explain of why biological tissues need to be specially prepared for microscopic examination & how differing processing method can yield different types of morphological information & distinguish the abnormality of the cells including inflammation, neoplasia, atroply, hypertrophy, hyperplasia & metaplasia.

A2. describe preparation of tissues for microscopy-dissection,fixation, embedding, sectioning.

A3. mention of the principles theoretical and practical bases of the techniques used in the histochemical method, enzyme histochemistry, immunohistchemistry / immunofluorescence & electron microscopy.

A4. show different types and modalities of microscopes, how they function and the differing information they can provide.

A5. describe diverse histochemical staining procedures–dyes, enzymes and antibodies.

B. Intellectual skills:

B1 evaluate a thorough comprehension of both the background knowledge techniques & recent advances in molecular & cellular methods

B2 gain complete coverage of the analyse and distinguish between normal & pathogenic abnormal organs together with the cellular & molecular bases by application of IHC or IF or cytochemical methods.

B3 contribute the understanding of biological tissue lesions & tumours by specific antibodies and markers, and the technical aspects of setting up of laboratory & interpreting respects.

B4 determine the morphological and the special stained with different techniques, and interpretation of staining.

B5 Formulate & test hypotheses using appropriate experimental design & analysis the data.

C. Professional and practical skills:

C1 competent to handle, prepare & diverse stains, and able to comment on a wide range of specimens.

C2 become proficient in the field of histology & hitochemistry and in applications in the field of immunohistochemistry & cytochemistry.

C3 use laboratory- based methods to generate data.

C4 use the scientific literatures & data bases effectively.

D. General and transferable skills:

D1 use information of diverse histochemical techniques to capable for differentiate between normal & abnormal cells, tissues & organs.

D2 evaluate information from a variety of sources, library, computer-assisted learning (CAL) & handouts

D3 learn independently with open mindedness & critical enquiry.

3. Content

Lecture 1	The **concept of histochemistry**, what is ment by histochemistry , and its applications to serve other branches of science such as physiology ,ecology, pharmacy .etc.

Lecture 2	**Tissue processing**: theories of fixation,choosing amongst the different fixatives for different tissues for different purposes, and the modes of action of each fixatives, tissue handling and what should be done to obtain a good specimen for examination for different research purposes i.e. different morphology as well as different chemical structures of each tissue.
Lecture 3	**Staining process,** theories of dyeing, chemistry & classification of dyes, choosing the correct dyes for the purpose.
Lecture 4	**Tissue analysis**, how to conclude facts and informations from the examined tissues.
Lecture 5	**Tissue damage and repair**: study of normal structures of cells and tissues of some organs such as liver, kidney and skin and their response to injuries of different types, their morphology after injury and how, if possible, they get cured or be repaired.
Lecture 6	**Cancer**: nature of cancer, difference between benign and malignant neoplasia, the structural alterations that are observed in malignant and plasia, the processes of invasion and metastasis, factors believed to cause cancer.
Lecture 7	**Selected topics and revision**, discussion of different subjects that interest students and relate to their research projects, revision and question & answer session.
Lecture 8	**Immunostaining methods: a) immunohistochemical techniques (IHC)**: definition, antigen retrieval, IHC methods: a) peroxidase anti-peroxidase (PAP) method, b) avidin biotin complex (ABC) method, c) direct & indirect methods.
Lecture 9	A continuous of IHC, d) labeled streptavidin biotin (LSAB) method, and d) polymeric methods, principles of procedures, significances and applications.
Lecture 10	**b) Immunofluorescence techniques (IF)**: introduction, definition, fluorescence microscopy, procedures: fixation, permeabilization, direct & indirect IF, stains of specific cellular structures, mounting media, significances & applications.
Lecture 11	**Inflammation:** introduction, definition, significance, symptoms & causes of inflammation. Types of inflammation: acute inflammation and chronic inflammation. Microscopic features of acute and chronic inflammation, and

differentiate between their cells using LM & TEM

Lecture 12	Use some specific antibodies (CD4, CD8, CD34) / IHC to detect the inflammatory cells. Use frozen section to demonstrate the stored lysosomal enzymes in the cytoplasm of infiltrated leukocytes.
Lecture 13	**Cytoskeletal protein filaments of red blood cells (RBCs)**: review of extracellular matrix filaments (cytoskeletal protein filaments): definition, types (microtubules, microfilaments & intermediate filaments), roles & functions. Types of cytoskeletal RBCs protein filaments (spectrin, actin, ankyrin,…), significances and functions.
Lecture 14	Relationship of cytoskeletal RBC protein filaments and plasma cell membrane (lipids & proteins). Procedures to visualize cytoskeletal RBC protein filaments using indirect immunofluorescence technique.
Lecture 15	**Cytochemistry**: introduction, subcellular organelles and their micromolecules (e.g. lipids, carbohydrades, proteins, enzymes, nucleic acids..etc). The objective of electron microscopic cytochemistry to visualize the intracellular localization of chemical reactions, enzyme activities, biochemical activities, antigenicity, etc.
Lecture 16	**Electron Microscopy:** TEM & SEM (differences, uses and applications)**, a)** preparation of biological materials for **TEM**: fixation (fixatives and methods of fixation)**,** osmofication
Lecture 17	A continuous of TEM: washing, dehydration and clearing, ultramicrotomy (sectioning) semithin & Ultrathin sections. Staining and examination then photograph.
Lecture 18	**b) SEM** process: fixation, osmofication , dehydration, drying (critical point drying), coating and examination, then photograph.
Lecture 19	**SEM x-ray microanalysis,** electron micrograph interpretation.
Lecture 20	**Polymerase chain reaction (PCR)** for gene amplification (specific segment of DNA), introduction, procedures, PCR optimization, practicle modifications & recent development in PCR technique.
Lecture21	Uses of PCR: genetic fingerprinting-genotyping of specific mutations-cloning genes-paternity testing- comparison of gene expression Mutagenesis- Detection of hereditary diseases- Revers Transcriptase –PCR (RT-PCR) for gene amplify mRNA.

Lecture 22	Study of the laser **confocal microscopy.**
Lecture 23	**Immunocytochemistry:** introduction, principles & function.
Lecture 24	Functional properties of antibodies (antigens, cell differentiation and maturation, production of poly and monoclonal antibodies).
Lecture 25	Immunocytochemical labels (enzyme labels, fluorescent labels, radiolabels).
Lecture 26	Mono, double and multiple labeling techniques.
Lecture 27	Detection of nucleic acids (histochemically, immunocytochemically, in situ **hybridization**).
Lecture 28	Neuro-anatomical techniques.

Practical	Topics	Week
Lab.1	Planning for a research project (by the students) using histochemistry and preparing the research tools needed for such a project.	1
Lab.2	Preparing the different agents required for the research project (i.e. fixatives, dehydrating agents, clearing agents….etc.) as well as staining solutions.	2
Lab.3	Tissue processing of different specimens for different organs of different nature such as brain, liver, kidney, gonads, different endocrine glands…..etc, and using different staining techniques.	3
Lab.4	Measuring methods using an ocular and stage micrometers and photographing of selected tissue elements.	4
Lab.5	Reading and analyzing photographs.	5
Lab.6	Revision	6
Lab.7	Questions & answers.	7
Lab.8	Selection of the appropriate technique & antibodies for specific purpose & interpretation of the immunostains.	8
Lab.9	Differentiate microscopically between the acute and chronic inflammatory cells using histological staining & TEM.	9

Lab.10	Use frozen section to demonstrate the stored lysosomal enzymes(acid phosphatase) in the cytoplasm of infiltrated leukocytes, and use specific antibodies as CD4,CD8, CD34 & IHC to detect the inflammatory cells, e.g. in lung of asthma & in pancreas of diabetes.	10
Lab.11	Visualization of a) cytoskeletal intermediate protein filaments using IHC techniques with specific antibodies in normal & pathogenic abnormal of some organs, e.g. cytokeratin, vimentin in thyroid gland & liver; and desmin in heart, b) microfilament (actin) in muscles.	11
Lab.12	Visualization of cytoskeletal RBC protein filaments using indirect immunofluorescence technique by using fluorescence microscopy, e.g. spectrin & tubulin in normal & pathogenic abnormal RBCs.	12
Lab.13	Comparison the same specimen by using histological routine stain and IHC and /or immunofluorescene methods, e.g. RBCs in normal case & pathogenic abnormal one.	13
Lab.14	Study of some organs using different techniques as histological histochemical/IHC and TEM to compare between the results of each one, as hydrolytic enzymes & other inclusions; secretory cells & organelles.Examples:1) pancreas; normal & abnormal cells of pancreatic acini and islets of Langerhans.2) thyroid gland; normal & pathogenic hypoactivity & hyperactivity of thyrocytes, 3) stomach,…	14
Lab.15	Electron microscopy (TEM & SEM), Principles, application and methods of preparation.	15
Lab.16	Magnifications, electron micrograph interpretation.	16
Lab.17	SEM x-ray microanalysis.	17
Lab.18	Electron microscopy in drug assessment and immunology.	18
Lab.19	Electron microscopic enzyme cytochemistry.	19
Lab.20	Immunocytochemical methods to detect specific proteins associated with subcellular structures (antibody-antigen interactions)	20
Lab.21	Thermal cycler for DNA: Making a cDNA library. Using RT-PCR to clone a single cDNA.	21
Lab.22	Different techniques to detection the nucleic acids	22
Lab.23	Mono labeling techniques to detect nucleic acids	23

Lab.24	Double labeling techniques.	24
Lab.25	Neuro-anatomical techniques (Cobalt chloride back filled techniques for staining the peripheral nervous system).	25
Lab.26	Neuro-anatomical techniques (Filling selected neurons with cobalt through cut axons).	26
Lab.27	A continuous of neuro-anatomical techniques (Cobalt staining of neurons by microelectrodes).	27
Lab.28	Revision	28

4. Teaching and Learning Methods

Lectures: including visual presentation using overhead projectors, PowerPoint presentation, blackboard and chalk, and seminars.

Practical classes: including laboratories, technique instruments, photomicrographs and microscopic slides.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I : Intellectual, P: Professional, T: Transferable

6. List of references:

Recommended Books

- Alberts, B.; Bray, D.; Lewis, J.; Raff, M.; Roberts, K. & Watson, J. 1989, 2nd Ed. Molecular Biology of the Cell. Garland Publishing, NY, London.

- Bancort, J. D. and Stevens, A. 2001, Theory and Practice of Hitological Techniques(Eds), Churchill Livingstone.

- Gurr, E. 1958, Methods of Analytical Histology and Histochemistry. Leonard Hill (Books) Ltd., London.

- Hamason,G.L. 1979, Animal Tissue Techniques. Freeman and Company. San Francisco.

- Larsson, L. I. 1988, Immunocytochemistry: Theory and Practice. CRC Press, Boca Raton, FL.

- Pearse, A.G.E. 1980, 4th Ed. Histochemisty, Theoretical and Applied. J & A. Churchill Ltd, London.

- Rogers, A.W. 1983, Cells and Tissues, an Introduction to Histology and Cell Biology, Academic Press, N.Y

- Thompson, S.W. 1966, Selected Histochemical and Histopathological Methods. Charles C. Thomas. Paplisher. Illinois.
- Troyer, H. 1980, Principles and Techniques of Histochemistry. Littles,Brown and Company, Boston.

Web Sites

- http://biowww.net/detail-176.html
- http://www.piercenet.com/Proteomics/browse.cfm?f1dID=F95B91A9-3DC1-4B56-8E.....

	Course Coordinator	Head of Department
Name	Prof. Nabila Ibrahim El-Desouki	Prof. Nabil Kamal Elfiki
Name (Arabic)	أ. د. نبيلة الدسوقى	أ. د.نبيل كمال الفقى
Signature		
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs																	
	KU					I					P				T		
	A 1	A 2	A 3	A 4	A 5	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	D 1	D 2	D 3
The **concept of histochemistry**	√																
Tissue processing		√	√														
Staining process,		√	√	√	√												
Tissue analysis		√															
Tissue damage and repair								√									
Cancer								√									
Selected topics and revision						√											
Immunostaining methods: a) immunohistochemical techniques (IHC)			√				√										
A continuous of IHC, d) labeled streptavidin biotin (LSAB) method applications.							√										
b) Immunofluorescence				√			√										

techniques (IF)																	
Inflammation	√																
Use some specific antibodies (CD4, CD8, CD34) / IHC to detect the inflammatory cells	√																
Cytoskeletal protein filaments of red blood cells (RBCs)	√																
Relationship of cytoskeletal RBC protein filaments and plasma cell membrane	√																
Cytochemistry	√																
Electron Microscopy a)TEM	√	√															
A continuous of TEM	√	√															
b) SEM	√	√															
SEM x-ray microanalysis,	√	√															
Polymerase chain reaction (PCR)	√																
Uses of PCR	√																

Study of the laser **confocal microscopy.**	√																
Immunocytochemistry:	√				√												
Functional properties of antibodies	√																
Immunocytochemical labels	√		√		√												
Mono, double and multiple labeling techniques.	√																
hybridization	√		√														
Neuro-anatomical techniques.	√																
Lab content	√																
Planning for a research project	√					√			√	√	√	√	√	√	√	√	√
Preparing the different agents required for the research project	√								√	√	√	√	√	√	√	√	√
Tissue processing of different specimens	√								√	√	√	√	√	√	√	√	√
Measuring methods using an ocular	√								√	√	√	√	√	√	√	√	√

Reading and analyzing photographs.	√								√	√	√	√	√	√	√	√	√
Revision	√																
Questions & answers.	√																
Selection of the appropriate technique & antibodies for specific purpose & interpretation of the immunostains.	√								√	√	√	√	√	√	√	√	√
Differentiate microscopically between the acute and chronic inflammatory cells	√								√	√	√	√	√	√	√	√	√
Use frozen section to demonstrate the stored lysosomal	√								√	√	√	√	√	√	√	√	√
Visualization of a) cytoskeletal intermediate protein filaments	√								√	√	√	√	√	√	√	√	√
Visualization of cytoskeletal RBC protein filaments	√								√	√	√	√	√	√	√	√	√

Comparison the same specimen by using histological routine stain	√								√	√	√	√	√	√	√	√	√
Study of some organs using different techniques as histological	√								√	√	√	√	√	√	√	√	√
Electron microscopy (TEM & SEM,	√								√	√	√	√	√	√	√	√	√
Magnifications , electron micrograph interpretation.	√								√	√	√	√	√	√	√	√	√
SEM x-ray microanalysis.	√								√	√	√	√	√	√	√	√	√
Electron microscopy in drug assessment and immunology.	√								√	√	√	√	√	√	√	√	√
Electron microscopic enzyme cytochemistry.	√								√	√	√	√	√	√	√	√	√
Immunocytochemical methods to detect specific proteins associated with subcellular structures	√								√	√	√	√	√	√	√	√	√

(antibody-antigen interactions)																	
Thermal cycler for DNA	√								√	√	√	√	√	√	√	√	√
Different techniques to detection the nucleic acids	√								√	√	√	√	√	√	√	√	√
Mono labeling techniques to detect nucleic acids	√								√	√	√	√	√	√	√	√	√
Double labeling techniques.	√								√	√	√	√	√	√	√	√	√
Neuro-anatomical techniques (Cobalt chloride back filled techniques	√								√	√	√	√	√	√	√	√	√
Neuro-anatomical techniques (Filling selected neurons with cobalt through cut axons).	√								√	√	√	√	√	√	√	√	√
A continuous of neuro-anatomical techniques	√								√	√	√	√	√	√	√	√	√

Course Title	Radiobiology	
Course Code	1612	
Academic Year	**2014/2015**	
Coordinator	**Asst. Prof. Ehab M. Tousson**	
Other Staff		
Level		
Semester	**One continuous academic year**	
Pre-Requisite		
Course Delivery	**Lecture**	**28 x 2h lectures**
	Practical	**28 x 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**February, 2014**	

1. Aims

This course will cover the principles of cell response to radiation, including tissue sensitivity, survival, repair and the latent effects of irradiated tissue. Topics to be covered include the development of radiation science, cellular targets for radiation action, target theory, physical/chemical factors affecting radiation response, biological factors, repair and recovery, fractionated doses and dose rate, early/acute effects of whole body exposure, late/chronic effects of whole body exposure, and radiation protection dose guidelines.

2. Intended Learning outcomes

Upon successful completion of this course the student should be able to:

A. Knowledge and understanding:

A8. identify the various types and sources of ionizing radiation.

A9. define radiation quantities and their units, as used in the assessment of radiation levels.

A10. sketch the interactions of radiation particles with molecules in tissue.

A11. identify the applications of radiation to the research laboratory and to medicine.

A12. describe the radiobiological outcome, when presented with the conditions of irradiation(e.g. type, energy, dose, dose rate, oxygen level, drugs).

A13. describe the biological impact of these events on living tissue at the molecular DNA, cellular, organ, and whole animal levels.

A7. define radiation protection dose guidelines**.**

B. Intellectual skills:

They will also acquire the ability to

B5. discuss the measures of radioactivity

B6. distinguish between the different types of radiation.

B7. illustrate the interaction of radiation and cells, tissues, organs.

B8. predict the pathological effects of radiation.

B9. determine the morphological and anatomical changes

B10. estimate the radiation effects in developing embryo.

B11. distinguish between the different types of radiation therapy

C. Professional and practical skills:

C1. gain experience by pathological effects of radiation.

C2. use basic laboratory equipment.

C3. gain knowledge about the biological effects of radiation, free radicals and cancer.

C4. use the scientific literatures and data bases effectively.

D. General and transferable skills

D1. evaluate information from a variety of sources, library, computer assisted learning and handouts.

D2. learn independently with open mindedness and critical enqurity.

3. Content:

Two hours weekly

Lecture 1	Historical overview
Lecture 2	Classification of radiation effects
Lecture 3	Types of ionizing radiation
Lecture 4	Radiation parameters
Lecture 5	Measures of radioactivity
Lecture 6	Radiation units

Lecture 7	Radioactive Decay low
Lecture 8	Basic concepts in radiation genetics
Lecture 9	Radiation effects on DNA
Lecture 10	Some important relationships in radiation genetics
Lecture 11	Genetic effects and carcinogenesis
Lecture 12	Effect of ionizing radiation on water
Lecture 13	Interaction of radiation and matter
Lecture 14	Interaction of radiation and cells
Lecture 15	Radiation cellular biology
Lecture 16	Evaluating radiosensitivity
Lecture 17	Acute effects of whole body irradiation
Lecture 18	Whole-body effects of ionizing radiation
Lecture 19	Patient decontamination
Lecture 20	External decontamination
Lecture 21	Internal decontamination
Lecture 22	Risk models for cancer induction
Lecture 23	Radiation and pregnancy
Lecture 24	Radiosensitivity during pregnancy (Spectrum of effects)
Lecture 25	Radiation effects in developing embryo
Lecture 26	Radiation carcinogenesis
Lecture 27	Radiation protection
Lecture 28	Revision
Assessment	
Practical part	Has the same topics shown above

4. Teaching and Learning Methods

- Lectures: including visual presentation using PowerPoint presentation, blackboard and chalk and seminars.
- Practical classes including laboratories, microscopic slides, photomicrographs and instruments.
- Internet and library research
- Writing Reports
- Assessments

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 16^{th} Week	60%
Oral Assessment	KU, I	Assessment Session	Term Final	5%
Practical Examination	P	2 Hour Examination	The 15^{th} Week	30%
Semester work	KU, I	Continuous Assessment		5%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Recommended Books:

- Radiobiology for the Radiologist EJ Hall, AJ Giaccia - 2006 - books.google.com
- Radiation Biology. A Hollaender - Soil Science, 1956 - soilsci.com,

Web sites:

http://www.uams.edu/chrp/radiationtherapy/coursedescriptions

http://bellevuecollege.edu

http://www.stvincent.org/education/radiography/descriptions.htm

http://www.uic.edu/com/uhrd/manual/Contents
http://radonc.yale.edu/training/radiobiology

7. Facilities required for teaching and learning

- Projectors; Video, Overhead and Slide.

- Computer Presentations and Writing Boards.

- Museum Models and Library.

	Course Coordinator	Head of Department
Name	Asst. Prof. Ehab M. Tousson	Prof. Nabil El-Fiky
Name (Arabic)	(أ. د. إيهاب مصطفى طوسون)	أ.د .نبيل الفقي
Signature		
Date	2014-2015	2014-2015

Contents	Academic standards intended learning outcomes ILOs																				
	KU							**I**							**P**				**T**	
	A 1	**A 2**	**A 3**	**A 4**	**A 5**	**A 6**	**A 7**	**B 1**	**B 2**	**B 3**	**B 4**	**B 5**	**B 6**	**B 7**	**C 1**	**C 2**	**C 3**	**C 4**	**D 1**	**D 2**
Historical overview																				
Classification of radiation effects	√								√											
Types of ionizing radiation	√																			
Radiation parameters	√							√												
Measures of radioactivity		√						√												
Radiation units		√						√												
Radioactive Decay low		√																		
Basic concepts in radiation genetics			√																	
Radiation effects on DNA			√							√										
Some important relationships in radiation			√							√										

genetics																				
Genetic effects and carcinogenesis			√							√										
Effect of ionizing radiation on water				√																
Interaction of radiation and matter				√	√	√	√													
Interaction of radiation and cells				√	√	√	√													
Radiation cellular biology				√	√	√	√													
Evaluating radiosensitivity				√	√	√	√													
Acute effects of whole body irradiation				√	√	√	√													
Whole-body effects of ionizing radiation				√	√	√	√													
Patient deconta				√	√	√	√				√									

mination																				
External decontamination				√	√	√	√					√								
Internal decontamination				√	√	√	√													
Risk models for cancer induction				√	√	√	√			√	√									
Radiation and pregnancy				√	√	√	√													
Radiosensitivity during pregnancy (Spectrum of effects)				√	√	√	√						√							
Radiation effects in developing embryo				√	√	√	√						√							
Radiation carcinogenesis				√	√	√	√													
Radiation protection				√	√	√	√													
Revision														√						
Practical part															√	√	√	√	√	√

Course Title	**Genetics**	
Course Code	**1613**	
Academic Year	**2014-2015**	
Coordinator	**Prof. Ahmed A. Massoud**	
Other Staff	**Prof. Ismail M. Al-Sharkawi**	
Level	**Master's Degree**	
Semester	**Continuous academic year**	
Pre-Requisite		
Course Delivery	**Lecture**	**28 2h lectures**
	Practical	**28 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

This course is of two parts. The first part is the molecular bases of inheritance. The second part describes the different principles and methods underpinning recombinant DNA technology and its application for human welfare.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module, students should acquire knowledge and an understanding of:

- A1. show the fundamental concepts of genetics, the biochemistry of genes and how genes act in normal conditions.
- A2. describe the interference of external factors with the genetic regular transfer within generations.
- A3. explain the principles of DNA technology.
- A4. identify gene cloning and genetic engineering of animals and plants.

B. Intellectual skills:

They will also acquire the ability to:

B1. discuss the basis of linking molecular to earlier (non-molecular) genetics.

B2. discuss how the structures of DNA and RNA differ, prokaryotic DNA duplication and the structure of eukaryotic chromosomes and repetitive DNA.

B3. choose the tools of genetic engineering in transgenesis.

B4. explain recombinant DNA technology for the warfare of human and to manipulate challenging health, economic and environmental issues.

C. Professional and practical skills:

C1. read the genetic code and translate a nucleic acid sequence to an amino acid sequence.

C2. determine how traits are transmitted from one generation to the next.

C3. apply common techniques e.g. polymerase chain reaction in relevant research areas.

D. General and transferable skills:

D1. use of information technology in self-learning.

3. Contents

Part - 1	**Molecular bases of inheritance** (An hour/week)
Lecture 1	The normal meiosis and mitosis; the effect of different alterations on these mechanisms.
Lecture 2	The interaction of the natural selection with the human gene pool; why certain abnormal disease-producing genes have been retained in the human gene pool.
Lecture 3	Differences between hereditary and teratogenic mechanism.
Lecture 4	How the major autosomal and sex chromosome trisomies arise and the possible effects of these abnormalities on the structure and function of the affected individual.
Lecture 5	The major theoretic ways that teratogens might act on developing tissue and congenital diseases with known etiology in relation to these possibilities.
Lecture 6	Gene structure and function.
Lecture 7	The arrangement of genes on chromosomes.
Lecture 8	DNA replication.
Lecture 9	Control of cell proliferation.

Lecture 10	Viral origins of cancer.
Lecture 11	Tools of genetic engineering of cells.
Lecture 12	Methods of biotechnology.
Lecture 13	Methods of preparing genetically engineered organisms.
Lecture 14	Some applications of biotechnology.

Part - 2	**Recombinant DNA** technology (An hour/week)
Lectures 1, 2	Introduction: Genes: Nature, concept and synthesis
Lectures 3, 4	Gene organization, gene regulation, transcription
Lectures 5, 6	Tools of recombinant DNA technology: 1.Basic requirements
Lectures 7, 8	2. Cutting and joining of DNA.
Lectures 9, 10	3. Cloning vectors
Lectures 11, 12	Techniques of genetic engineering
Lectures 13, 14	1. Cloning Methods
Lectures 15, 16	2. DNA analysis
Lectures 17, 18	Genetic engineering for human welfare
Lectures 19, 20	Genomics
Lectures 21, 22	Proteomics
Lectures 23, 24	Bioinformatics
Lectures 25, 26	Manipulation of reproduction and transgenic animals
Lectures 27, 28	Biotechnology in agriculture
Weeks 30, 31	**Assessment**
Practical part	**Has the same topics showed above**

4. Teaching and Learning Methods

- Lectures.

5- student assessments

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes: Handouts.

Essential Books:

- . (**For Part 1 of the course**).
- Murray, R. K.; Granner, D. K.; Mayes, P. A.; Rodwell, V. W. (2006). Harper's Illustrated Biochemistry Sourse: 7th Ed . McGraw-Hill. (**For Part - 2 of the course**).

Recommended Books:

Web sites:

7. Facilities required for teaching and learning

- Projectors: video and overhead.
- Computer presentations and writing Boards
- Spectrophotometer, pH meter, analytical balance; waterbaths.
- Traditional laboratory glassware and plasticware.
- Live animal specimens.
-

Library.	**Course Coordinator**	**Head of Department**
Name	Prof. Ahmad Masaaod	Prof. Nabil Kamal Elfiki
Name (Arabic)	أ. د. أحمد مسعود	أ. د.نبيل كمال الفقى
Signature		
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs											
	KU				I				P			T
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1
Molecular bases of inheritance												
The normal meiosis and mitosis	√											
The interaction of the natural selection with the human gene pool										√		
Differences between hereditary and teratogenic mechanism.	√								√	√		
How the major autosomal and sex chromosome trisomies arise		√							√	√		
The major theoretic ways that teratogens might act on developing tissue	√								√	√		
Gene structure and function.	√											
The arrangement of genes on chromosomes.	√											
DNA replication.	√		√									
Control of cell		√										

proliferation.												
Viral origins of cancer.		√										
Tools of genetic engineering of cells.												
Methods of biotechnology.	√		√									
Methods of preparing genetically engineered organisms.	√			√								
Some applications of biotechnology.	√		√									
Recombinant DNA technology (An hour/week)	√		√									
Introduction	√											
Gene	√											
Tools of recombinant DNA	√		√						√			
Cutting and joining of DNA.	√								√			
Cloning vectors	√								√			
Techniques of genetic engineering	√		√	√					√			
1. Cloning Methods	√			√					√			
2. DNA analysis	√				√							
Genetic engineering for	√			√								

human welfare												
Genomics	√											
Proteomics	√											
Bioinformatics	√				√							√
Manipulation of reproduction and transgenic animals	√											
Biotechnology in agriculture			√	√								
Assessment												
Practical part								√	√	√	√	√

Course Title	Experimental Embryology	
Course Code	**1614**	
Academic Year	**2014-2015**	
Coordinator	**Prof. Foad Afifi Abozaid**	
Other Staff	**Prof. Nabil Elfiki**	
Level	**Master's Degree (Experimental Zoology)**	
Semester	**Continuous academic year**	
Pre-Requisite		
Course Delivery	**Lecture**	**28 2h lectures**
	Practical	**28 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

This course provides students with the principles of embryology with emphasis on current experimental approaches utilized in research of normal and abnormal development of the mammalian embryo.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module, students should acquire knowledge and an understanding of:

A1. describe the processes of early embryonic development.

A2. show current methodologies for conducting research in the field of embryology.

B. Intellectual skills:

They will also acquire the ability to:

B1. predict new solutions to scientific related problems.

C. Professional and practical skills:

C1. carry out exercises and demonstrations to emphasize topics covered.

C2. gain experience with embryos and techniques used to study them.

D. General and transferable skills:

D1. use of information technology in reviewing recent literature and in self-learning.

3. Contents

Lecture 1,2	Molecular Biology Review; Cell Cycle.
Lecture 3.4	Cell Cycle Paper Discussion; Sterile Technique and Intro to Moving Eggs/Embryos.
Lecture 5.6	In Vivo Oocyte Maturation and Fertilization; In Vitro Maturation and Fertilization (IVM/IVF).
Lecture 7,8	In Vitro Maturation/Fertilization Paper Discussion; Oocyte Collection and In Vitro Maturation.
Lecture 9,10	In Vitro Culture of Embryos; IVP Paper Discussion.
Lecture 11,12	Preimplantation Development; In Vitro Fertilization, Embryo culture, Grading and Freezing.
Lecture 13,14	Artificial Reproductive Technologies; ART Paper Discussion.
Lecture 15,16	Maternal Zygotic Transition; Embryo RNA Isolation and Reverse Transcription.
Lecture 17,18	Epigenetics and Imprinting.
Lecture 19,20	Epigenetics and Imprinting; Epigenetics Paper Discussion.
Lecture 21,23	Gene detection by PCR; Sex Determination.
Lecture 24,25	Germ Cells and Gametogenesis; Gel Electrophoresis of PCR products/introduction to cloning DNA.
Lecture 26,27	Transgenesis; Pronuclear Microinjection.
Lecture 28	Nuclear Transfer.
Practical	**Has the same topics shown above**

4. Teaching and Learning Methods

- Lectures.
- Practical classes.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

Essential Books:

- Developmental Biology. Scott F. Gilbert. Sixth Edition.
- The Developing Human: Clinically Oriented Embryology. Keith L. Moore. Fourth Edition.
- Handbook of In Vitro Fertilization. Alan O. Trounson and David K. Gardner. Second Edition.
- Clinical Embryology: A Color Atlas and Text. Murray Brookes and Anthony Zietman.
- An Atlas of Preimplantation Genetic Diagnosis. Yury Verlinsky and Anver Kuliev.

7. Facilities required for teaching and learning

- Projectors: video and overhead.
- Analytical balance; waterbaths; incubators.
- Traditional laboratory glassware and plasticware.
- Animal specimens; representative slides.
- Library.

	Course Coordinator	Head of Department
Name	Prof. Fouad Abozaid	Prof. Nabil Kamal Elfiky
Name (Arabic)	أ. د. فؤاد أبو زيد	أ. د. نبيل كمال الفقى
Signature		
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs					
	KU		I	P		T
	A1	A2	B1	C1	C2	D1
Molecular Biology Review; Cell Cycle.	√					
Cell Cycle Paper Discussion; Sterile Technique and Intro to Moving Eggs/Embryos.	√					
In Vivo Oocyte Maturation and Fertilization; In Vitro Maturation and Fertilization (IVM/IVF).	√					
In Vitro Maturation/Fertilization Paper Discussion; Oocyte Collection and In Vitro Maturation.	√					
In Vitro Culture of Embryos; IVP Paper Discussion.	√		√			
Preimplantation Development; In Vitro Fertilization, Embryo culture, Grading and Freezing.	√					
Artificial Reproductive Technologies; ART Paper Discussion.	√					
Maternal Zygotic Transition; Embryo RNA Isolation and Reverse Transcription.	√					
Epigenetics and Imprinting.	√					
Epigenetics and Imprinting; Epigenetics Paper Discussion.		√				
Gene detection by PCR; Sex Determination.		√				
Germ Cells and Gametogenesis; Gel Electrophoresis of PCR products/introduction to cloning DNA.		√				
Transgenesis; Pronuclear Microinjection.		√				
Nuclear Transfer.		√				
Practical part				√	√	√

Course Title	**Immunology**	
Course Code	**1615**	
Academic Year	**2014-2015**	
Coordinator	**Prof. Ibrahem B. Helal**	
Other Staff	**Prof. Ismail M. Al-Sharkawi;**	
Level	**Master's Degree (Experimental Zoology)**	
Semester	**Continuous academic year**	
Pre-Requisite		
Course Delivery	**Lecture**	**28 2h lectures**
	Practical	**28 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**September 2014**	

1. Aims

This course will provide an overview or introduction to the immune system, and the cells and molecules involved in immunity. Emphasis will be placed on describing the molecular genetic processes involved in the immune system and how these events relate to the production of an effective immune system.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module, students should acquire knowledge and an understanding of:

A1. identify the main cell types in the mammalian immune system.

A2. describe the structure of lymphoid organs and how this changes in infection.

A3. show the enzymatic nature of the of the complement cascadde.

A4. describe the nature of interaction detwen antigens and antibody.

B. Intellectual skills:

They will also acquire the ability to:

B1. discuss how cells and molecules of the immune system interact.

B2. predict the importance of the subject of immunology in many areas of biology and medicine

B3. discuss how the MHC system controls immune recognition.

B4. discuss how chemical mediators orchestrate the inflammatory response.

C. Professional and practical skills:

C1. tackle the major techniques of interaction of antibody with antigen and applications in laboratory investigations.

D. General and transferable skills:

D1. use of information technology in self-learning.

3. Contents

Part – 1 (Two hours/week)

Lectures 1 - 2	**An Introduction to Immunology** Components of the immune system, the importance of non-self discrimination and specific recognition of antigens.
Lectures 3 - 4	**Antibody Structure** Structure and function of the antibody classes. Antibody production and clonal selection. Introductionto antibody gene rearrangement
Lectures 5 - 6	**Antibody Gene Rearrangements I** Genetic mechanisms of antibody gene rearrangement.
Lectures 7 - 8	**Antibody Gene Rearrangements II** Increasing antibody binding by somatic hyper-mutation and changing antibody class.
Lectures 9 - 10	**Introduction to MHC Class I and II Molecules** Structure of the MHC Class I and Class II molecules, genetics and disease association.
Lectures 11 - 12	**Recognition of MHC Plus Peptide by T Cells** T cell recognition of antigen and MHC genetic variation of the immune response.

Lectures 13 - 14	Examination
Lectures 15 - 16	**T Cell Gene Rearrangements** Mechanism of T cell gene rearrangement and the recombinase genes.
Lectures 17 - 18	8 **Immunological Tolerance** Positive and negative selection. The use of transgenic animals as models of B and T cell tolerance.
Lectures 19 - 20	**Molecular Immunology and Disease** Mechanisms of immunologically mediated disease and disease models.
Lectures 21 - 22	**Immunity and parsitic diseases - 1**
Lectures 23 - 24	**Immunity and parsitic diseases - 2**
Lectures 25 - 26	**Genetic Engineering of Antibodies and their use in Therapy** Production of recombinant antibodies *in vitro* and their application in the treatment of human disease.
Lectures 27 - 28	**Molecular Techniques and Improved Immunotherapy** Discussion of the ways in which molecular techniques can and are being used to boost the immune response to tumors and infectious disease
Weeks 30, 31	**Assessment**
Practical part	**Correspond to the above topics**

4. Teaching and Learning Methods

- Lectures.
- Practical classes.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:- Handouts.

Essential Books:

- Janeway, C. A. and Travers, P. (1996). Immunobiology: The immune system in health and disese: 2nd Ed . Current biology Ltd. London, San Francisco and Philadelphia.

Web sites:

7. Facilities required for teaching and learning

- Video projectors and writing Boards.
- Kits based on immunological tests.
- Spectrophotometer, pH meter, analytical balance; waterbaths.
- Traditional laboratory glassware and plasticware.
- Live animal specimens.
- Library.

	Course Coordinator	Head of Department
Name	Prof. Ibrahim B. Helal	Prof. Nabil Kamal Elfiki
Name (Arabic)	أ. د. إبراهيم بكر هلال	أ. د.نبيل كمال الفقى
Signature		
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs									
	KU				I				P	T
	A1	A2	A3	A4	B1	B2	B3	B4	C1	D1
An Introduction to Immunology	√									
Antibody Structure				√						
Antibody Gene Rearrangements I				√						√
Antibody Gene Rearrangements II				√						
Introduction to MHC Class I and II Molecules							√			
Recognition of MHC Plus Peptide by T Cells							√			
Examination										
T Cell Gene Rearrangements		√								
8 **Immunological Tolerance**		√			√	√		√		
Molecular Immunology and Disease		√			√	√		√		
Immunity and parsitic diseases - 1		√								
Immunity and parsitic diseases - 2		√								
Genetic Engineering of Antibodies and their use in Therapy			√							
Molecular Techniques and Improved Immunotherapy									√	
Practical part									√	√

Course Title	**Biostatistics**	
Course Code	**1618**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Abd-Elmoneim Anwar Mohamed**	
Other staff		
Level	**Preparatory level for MSC**	
Semester	**Continuous academic year**	
Pre-Requisite		
Course delivery	**Lecture**	**28 x 1h lectures**
	Practical	**-**
Parent Department	**Mathematics Department**	
Date of approval	**September, 2014**	

1. Aims

This module aims to provide M. Sc. students in biology with basic concepts of study design and data analysis suitable for laboratory and field research, and to help students to develop the skills needed to apply statistical methods using related statistical software; e.g. Primer or GraphPad in scientific biological research. Emphasis will be on practical and applied skills using example of relevance to biology students.

2. Intended Learning outcomes

A. Knowledge and understanding:

By the end of this course the students should be able to*:*

- A13. raise students' consciousness concerning basic statistical issues such as statistical measures for data description; statistical estimation; correlations and testing hypothesis.
- A14. understand the basic principles of study design.
- A15. describe the types of variables that are used in biological research.
- A16. appreciate the role of sampling variation, how to quantify the variability, and its role in comparing groups or categories.

B. Intellectual skills:

B9. carry out confidently simple essential statistical methods in biological research and to interpret results.

B10. select appropriate statistical methods for analysis of simple data sets and apply them on a computer using bio-statistical software, GraphPad.

B11. summarise data using graphical and tabular data.

B12. interpret research findings and explain them in a clear, concise and logical manner.

C. Professional and practical skills

C7. select and apply appropriate basic statistical methods for analysis of data.

C8. use GraphPad package in data analysis.

C9. tackle skills in handling data on a computer and otherwise, and deriving and presenting quantitative results using appropriate tables, figures, and summaries.

D. Transferable skills

D10. write report including graphical material.

D11. present and discuss the finding from statistical analysis in a clear, concise and logical manner.

D12. use internet and other electronic sources as a source of information.

3. Contents

	Analysis and design of research studies (two hours/week)
Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.

Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.
Lectures 27-28	Design of experiments: The null hypothesis, statistical significance and rejecting the null hypothesis.
Lectures 29-30	Revision
Weeks 31, 32	**Assessment**

4. Teaching and Learning Methods

- Lectures are an integral part of course delivery in this course, supported by problems classes, tutorial groups, computational work, office hours, and individual tutorials.

- Students engage in private study in which they work through set problem sheets and individual assignments as well as assimilating lecture content.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 16th Week	90%
Oral Assessment	KU, I	Assessment Session	Term Final	5%
Semester work	KU, I	Continuous Assessment		5%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential books

- Glantz, Stanton A. (2005): Primer of Biostatistics, 6th Edition McGraw-Hill.

Recommended books

- Samuels, M. L. (1989): Statistics for the Life Sciences. Dellen Publishing Company, USA.
- Rosner, B. (1990): Fundamentals of Biostatistics. PWS-Kent Publishing Company, USA.

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computers Presentations and Writing Boards
- Primer or GraphPad biostatistics software.

	Course Coordinator	Head of Department
Name	Prof. Abd-Elmoneim A. Mohamed	Prof. Mohamed A. Beltagy
Name (Arabic)	أ. د. عبد المنعم محمد طعيمه	أ. د. محمد بلتاجى غباشي
Signature		
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs													
	KU				I				P			T		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3
Introduction.	√	√	√	√										
Summarizing data.	√	√	√	√										
Sampling variability of a mean.	√	√	√	√										
Analysis of quantitative data	√	√	√	√										
ANOVA	√	√	√	√	√	√	√	√						
Examination.	√	√	√	√										
Sampling variability of proportions.	√	√	√	√										
Analysis of categorical data	√	√	√	√		√								
Regression and correlation.	√	√	√	√										
Comparing correlations.	√	√	√	√										
Regression and correlation	√	√	√	√					√	√	√	√	√	√
Comparing distribution	√	√	√	√					√	√	√	√	√	√
Comparing means	√	√	√	√					√	√	√	√	√	√
Comparing variances	√	√	√	√					√	√	√	√	√	√

Course Title	**Computer**	
Course Code	1617	
Academic Year	**2014/2015**	
Coordinator	**Prof. Mohamed El-Awady**	
Other Staff	**Prof. Mahmoud Kamel, Prof. Ahmed El-Shishtawy, Prof. Qadry Zakaria**	
Semester	**Continuous academic year**	
Pre-Requisite		
Course Delivery	**Lecture**	**16 x 1h lectures**
	Practical	**16 x 1h practicals**
Parent Department	**Computer Centre**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to acquire a range of transferable skills that are important for post graduate M. Sc. students to:

- Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.
- Underpin academic work throughout postgraduate studies.
- Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

A. Knowledge and understanding:

Upon successful completion of this course the students should be able to:

A1. Demonstrate knowledge and understanding of the use of IT in the context of their postgraduate studies.

A2. Know the diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.

A3. Carry out necessary graphical, statistical and frequency analyses of different types of data.

A4. Create powerful presentation using sophisticated software packages.

A5. Make use of different internet resources.

A6. Solve scientific problems using computer programming.

A7. Make use of different photo enhancing and manipulation techniques.

B. Intellectual skills:

They should also acquire the ability to:

B2. Integrate different application programs to develop effective information analysis and presentation.

C. Professional and practical skills:

C1. Use a number of computer packages to present information.

D. General and transferable skills:

D2. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Lectures 1-2	Methods for graphical representations, Data analysis and Data modeling **Assignment 1** : **Using Application programs** Calculation of Slope and intersection of lines , Best fitting for data, Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)
Lectures 3-5	Statistical Data analysis **Assignment 2** : **Using Application programs** Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data
Lecture 6-7	Creating powerful presentation including charts, images, video, etc and different attractive animations **Assignment 3** : **Using PowerPoint program** Design a real and powerful presentation with different acquired skills
Lecture 8-9	Use of internet capabilities and searching engines **Assignment 4: Using the Internet** Life search on the internet for some real information

Lecture 10-11	Creating Data Base and related Queries and Reports
	Assignment 5: Using Application programs
	Creating a real Data Base and apply different queries and reports to extract useful information
Lecture 12-13	Computer programming language
	Assignment 6: Programming using Visual Basic 6
	Solving real problems using a computer language
Lecture 14-15	Photo manipulation and enhancement using the photoshop
	Assignment 7: **Using the Photoshop program**
	Practicing on manipulation and enhancing of images
Lectures 16	Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Assignments

The course is delivered through lectures, practical sessions and assignments. Team working skills are developed on a week-long laboratory exercises and the students present and defend their findings in a public seminar.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

	Course Coordinator	Head of Department
Name	Prof. Mohamed M. El-Awady	Prof. Elsayed Taha Rezk
Name (Arabic)	أ.د.محمد العوضي	أ.د. السيد طه رزق
Signature		
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs									
	KU							I	P	T
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Methods for graphical representations, Data analysis and Data modeling										
Assignment 1 : Using Application programs	√	√	√	√	√	√	√			
Statistical Data analysis	√	√	√	√	√	√	√	√		
Assignment 2 : Using Application programs	√	√	√	√	√	√	√	√		
Creating powerful presentation	√	√	√	√	√	√	√			
Assignment 3 : **Using PowerPoint program**	√	√	√	√	√	√	√		√	
Use of internet capabilities and searching engines	√	√	√	√	√	√	√			√
Assignment 4: Using the Internet	√	√	√	√	√	√	√			√
Creating Data Base and related Queries and Reports	√	√	√	√	√	√	√			
Assignment 5: Using Application programs	√	√	√	√	√	√	√			
Computer programming language	√	√	√	√	√	√	√			
Assignment 6: Programming using Visual Basic 6	√	√	√	√	√	√	√			
Photo manipulation and enhancement using the photoshop	√	√	√	√	√	√	√			
Assignment 7: **Using the Photoshop program**	√	√	√	√	√	√	√			

M.Sc. Programme
of
Comparative Anatomy
of Invertebrates

Academic Reference Standards for M.Sc. degree in Comparative Anatomy of Invertebrates

1. Academic Standards:

The Academic Reference Standards (ARS) for the award of the M.Sc. degree in Comparative Anatomy of Invertebrates are designed to provide students with the knowledge and skills for proficiency in Zoological Science. The National Authority for Quality Assurance and Accreditation of Education (NAQAAE) for M.Sc. degree is used as the core of this academic standards to determine appropriate content and process skills for students. The relationship between science, our environment, and our everyday world is crucial to each student's success and should be emphasized. Science consists of a way of thinking and investigating, and includes a growing body of knowledge about the natural world. To become literate in science, therefore, students need to acquire understandings of both the Characteristics of Science and its Content.

The following Specific ARS for the M.Sc. in Zoology were approved by the Council of the Faculty of Science, Tanta University.

1.1. Graduate Attributes:

Graduate of M.Sc. Program in Comparative Anatomy of Invertebrates Should be Able to:

- 1.1.1-Apply the knowledge of Zoological Science and their related disciplines, applications and tools in solving scientific problems.
- 1.1.2-Apply the analytical methods in Zoology research.
- 1.1.3-Apply specialized knowledge in Zoology combined with related knowledge in professional practice.
- 1.1.4- Show awareness of the ongoing problems in the minor specialization.
- 1.1.5- Use appropriate technological resources to serve and improve the professional practice.
- 1.1.6- Communicate effectively and lead teams.
- 1.1.7- Show awareness of his/her role in community development and preservation of the environment in light of global and local changes.
- 1.1.8- Share in multidisciplinary team work and be flexible for adaptation and working under contradictory conditions.
- 1.1.9- Hold professional values that maintain individuality, positive thinking and self-confidence.
- 1.1.10- Collect, summarize and present data, undertake professional and ethical responsibilities.

1.2. Knowledge and Understanding:

Students analyze how scientific knowledge is developed and will understand important features of the process of scientific inquiry. By the end of the program, the M.Sc. holder must have precise knowledge in different areas and research fields in zoology and be able to:

1.2.1- Investigate the advanced knowledge and training in one or more areas of Zoology with more specific subject-related skills in one of these areas.

1.2.2- Explain the theoretical and practical knowledge of various Zoological aspects, their knowledge which are required for professional activities in the field of Zoology research career.

1.2.3- Demonstrate a comprehensive understanding of essential literature in their specific research area.

1.2.4- Define the scientific progress in the area of his/her minor specialty.

1.2.5-Write on the routine applied for interpreting and analyzing Zoological information.

1.2. 6- Illustrate the principles of ethics in scientific studies and research.

1.3. Intellectual Skills

Students will apply the following to inquiry intellectual practices:

1.3.1- Criticize approach to any Zoological and environmental problems which they may encounter.

1.3.2- Postulate and deduce mechanisms and procedures to handle scientific problems.

1.3.3-Perform perfectly the modern professional practice in the minor specialty of Zoology.

1.3.4- Apply a significant information gathering and analytical skills in an area of applied research in Zoology.

1.3.5- Develop lines of argument and appropriate judgments in accordance with the scientific theories and concepts.

1.3.6- Create plan to develop performance in the minor area of specialty.

1.3.7- Apply appropriate physical principles to create and analyze system components

1.3.8- Evaluate the risks in professional practices in the minor area of specialty.

1.3.9-Analyze and estimate knowledge in the area of minor specialty and use it in solving research problem.

1.3.10- Reconstruct the available resources effectively and develop them.

1.3.11- Differentiate between subject-related theories and assess their concepts and principles.

1.3.12- Analyze, synthesize, assess and interpret qualitatively and quantitatively science relevant data.

1.3.13- Construct several related integrated information to confirm, make evidence and test hypothesis.

1.3.14- Use theories of zoology to interpret results.

1.4. Professional and practical skills:

Students will be encountered important features of the process of scientific inquiry and by the end of the program, the M.Sc. holder must be able to:

1.4.1- Perform the skills of analytical biological information in selecting the appropriate biological instrumentations and laboratory techniques in various fields of Zoology.

1.4.2- Plane, design, conduct and report on the investigated data, using appropriate techniques and considering scientific guidance.

1.4.3- Store sufficient idea for methods of collection, classification, preservation and analysis of animal samples.

1.4.4- Apply techniques and tools considering scientific ethics.

1.4.5- Perform research in Zoological sciences and demonstrate proficiency in the techniques and methods appropriate for their research area in minor specialty.

1.4.6-Design and conduct a research project and be able to present the results to an appropriate forum both in oral and in written format.

1.4.7- Proficiently teach the laboratory sections in Zoology as well as one specialty area and able to compete positively for jobs in academic and private area.

1.4.8- Collect evidences to test and confirm the scientific hypothesis in the field of minor specialty.

1.4.9- Implant comprehensive physical knowledge and understanding as well as intellectual skills in research tasks.

1.4.10- Use the national standards for laboratory equipment which are essential for practical work.

1.5. General and Transferable Skills.

By the end of the program, the M.Sc. holder must be able to:

1.5.1- Oral and written communicate and exchange the information effectively through seminars and discussion meetings.

1.5.2- Effectively use information and communication technology and identify roles and responsibilities, and their performing manner.

1.5.3- Think independently, set tasks and solve problems on scientific basis.

1.5.4- Work in group effectively, manage time and communicate with others positively.

1.5.1- Consider community linked problems, ethics and traditions and acquire self- and long life–learning.

1.5.5- Deal with scientific data in Arabic, English or other languages.

1.5.6- Apply effectively scientific models, systems, , information technology, and tools and deal with scientific patents, also, exhibit the sense of beauty and neatness.

1.5.7- Fit the ethics of scientific research.

2- Curriculum Structure and Contents:

٢.1- Program duration: At least two years for the thesis preparation.

٢.2- Program Structure: Thesis in different branches of zoology.

Thesis

The thesis of M.Sc. program in Zoology is a formal written document representing sustained research into an important intellectual issue. The thesis must be an independent effort which contributes to the accumulated understanding of the field in which it is written. The required research preparation and advanced research methods courses will help the student to focus his or her research effort, and provide general guidelines for research approach and report preparation. Thesis will be reviewed and approved by the candidate's supervising professor and external academic review committee.

a. The thesis should contain the following:

- Title page (title, name of student, university, faculty, name of program, date, supervisors
- Table of contents
- Introduction, containing a definition of the thesis statement, working method, the theoretical framework, and the aim.
- Literature review.
- Materials and methods.
- Results
- Discussion and conclusions
- References.

b. Language of the thesis:

The thesis must be written in English language accompanied by a summary in Arabic.

c. Formation of Examiners Committees

A committee is selected by zoology Department Council. The M.Sc. Degree is awarded to the applicant by University, upon the recommendation of the department and the Faculty Council.

4. Program Admission Requirements:

An applicant for admission to the M.Sc. program in zoology should hold an B.Sc. degree in zoology with a minimum grade of (Good = 70%)

4- Program Student Evaluation

- Courses of pre-master academic year
- At least one published paper
- Written thesis
- Public hearing
- Defense exam

A. Program Specification

Program Title	**MSc-Comparative Anatomy of Invertebrates**
Award	**Master of Comparative Anatomy of Invertebrates**
Parent Department	**Zoology Department**
Teaching Institution	**Faculty of Science – TU**
Awarding Institution	**Tanta University**
Coordinator	**Prof.** Mohamad Mona
External Evaluator(s)	**applied**
QAA Benchmarking Standards	**Academic Reference Standards (ARS)**
Other Reference Points	**Bioscience, Egyptian Code of Assessment**
Date of intake	**Every year in September**
Review Date	**Internal Periodic Review, Summer 2014**
Date of Approval	**September, 2014**

1. Aims

- To develop the knowledge of the major taxonomic features that is used to identify each group including down to the class level of the main invertebrate phyla.

- To develop a critical analysis on the phylogenetic relationship among major invertebrate groups incorporating both traditional morphologically based hypothesis as well as recent molecular hypothesis.

- To provide the major principles of development and comparative patterns of invertebrate embryology.

- To transfer skills in verbal communication, presentation and interpretation, group membership and leadership.

- To provide arrange of practical skills, ecological and systematic methods, research techniques and advanced knowledge appropriate to employment in a wide range of contexts (such as environmental sector, ..ect.).

- To provide the students with a concept of study design and data analysis suitable for laboratory and field research.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire the ability to:

A17. Explain evolutionary relationships among different taxa and describe basic morphological, physiological, ecological and behavioural characteristics of invertebrate animals to provide a foundation for further studies in biology .

A18. Describe the anatomical basis for nutrition, osmoregulation, excretion, digestion, reproduction, development, locomotion and sensory interactions with the environment in a phylogenetic context. .

A19. Describe basic methodologies for identification and classification of invertebrate animals.

A20. Describe the process of gamete production, fertilization and the development in invertebrate groups.

B. Intellectual skills:

They will also acquire the ability to:

B26. Formulate a hypothesis, plan and execute laboratory investigation or development work, evaluate the outcomes and draw valid conclusions.

B27. Discuss aspects of a chosen topic in – depth manner.

B28. Plan and write original essay evaluating published research articles and addressing issues of importance selected from various topics covered by the degree.

B29. Analyse, synthesise and assimilate diverse information in a critical manner.

B30. Construct reasoned arguments to support a position on the ethical and social impact of scientific advances and appreciate the existence of different points of view.

B31. Integrate theory and practice.

C. Professional and practical skills:

C20. Identify and describe the differences between individual within different taxa.

C21. Dissect invertebrate animal to describe the differences in anatomical structure, collect and preserve mature gametes.

C22. Write a scientific report concerning the variations among examined invertebrates.

C23. Operate statistical estimations such as correlation and testing hypothesis.

D. General and transferable skills:

D30. Communicate about a subject clearly, confidently and effectively using a range of presentational techniques.

D31. Apply numerical and IT skills with confidence and accuracy.

D32. Take responsibility for self-managed learning and personal/professional development.

D33. The capacity to work with a strong sense of direction and creativity.

D34. communicate effectively and professionally by written and graphical form.

D35. Collect, record, analyze and interpret data from a range of sources.

3. Academic standards

3.A External references for standards (Benchmarks):

academic reference standards(ARS)

4. Curriculum Structure and contents:

4.A	Programme duration: one year					
4.B	Programme structure					
4.B.1	Number of contact hours		per Week:			
			Lectures	6	Lab.	6
	Overall	Contact hours	Lectures	10	Lab.	9
4.B.2	Number of contact hours		Compulsory	6	Optional	6
4.B.3	Thesis					

5. Programme courses

Year 1	Course Title	Lec.	Prac.	Program ILOs Covered
Three of the first five courses are obligatory:				
1	Histology	2	2	KU, I, P,T
2	Comparative Anatomy of Invertebrates	2	2	KU, I, P,T
3	Invertebrate Embryology	2	2	KU, I, P,T
4	Invertebrate Phylogeny	2	2	KU, I, P,T
5	Biostatistics	1	-	KU, I,P, T
6	Computer	1	1	KU, I,P, T

6. Programme admission requirements

Arrangements for admission are based on the national guidelines with no Faculty control on the number of newly enrolled students.

Candidates must satisfy the general admission requirements of the University, Faculty in Biology and also hold one of the following:

The applicants must have obtained a Bachelor’s degree, or its equivalent, in Zoology with a “good” degree as a minimum for approval.

7. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression:

- The programme includes one year of coursework, followed by a research project, i.e. the Master thesis, by laboratory investigation in a mentored environment.

- Assessment is held by the end of the first year, and student will be eligible only on attaining a “pass” degree (60%).

- The student who fails certain course at the first attempt will be eligible for only a “Pass” degree following only one re-set examination.

- The student can submit his thesis only after one year from the date of the Faculty Council approval on the thesis subject.

8. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Not applied yet	
2. Alumni	Not applied yet	
3. Stakeholders(Employers)	Not applied yet	
4. External Evaluator(s)(External Examiner(s))	applied	
5. student questionnaire	applied	A questionnaire applied on courses individually

We certify that all of the information required to deliver this programme is contained in the above specification and will be implemented. All course specifications for this program are in place

Name	Signature	Date
Programme Coordinator: Prof. Mohamad H. Mona (أ. د. محمد حسن منا)	……..……..………..………	/9/2014
Head of Quality Assurance Unit: Prof. Hoda Kamal Elsayed (أ. د. هدى كمال السيد)	……..……..………..………	/9/2014
Dean of the Faculty: Prof. Tarek Fayed (أ. د. طارق فايد)	……..……..………..………	/9/2014

M.Sc. Courses: Programme Matrix

Programme Title: Master of Science (M.Sc.) degree in Physiology

Programm intended learning outcomes ILOs	Academic standards intended learning outcomes ILOs																			
	KU						I							P		T				
	A 1	A 2	A 3	A 4	A 5	A 6	B 1	B 2	B 3	B 4	B 5	B 6	B 7	C 1	C 2	D 1	D 2	D 3	D 4	D 5
A1. Explain evolutionary relationships	√																			
A2. Describe the anatomical basis for nutrition																				
A3. Describe basic methodologies																				
A4. Describe the process of gamete production																				
B1. Formulate a hypothesis.									√											
B2. Discuss aspects of a chosen topic in – depth manner.										√										
B3. Plan and write original essay evaluati								√												

ng published																				
B4. Analyse, synthesise and assimilate diverse information in a critical manner.						√														
B5. Construct reasoned arguments to support a position on the ethical										√										
B6. Integrate theory and practice										√										
C1. Identify and describe the differences between individual within different taxa.													√							
C2. Dissect invertebrate animal to describe the differences in anatomical structur														√	√					

e.																				
C3. Write a scientific report concerning the variations among examined invertebrates.																				
C4. Operate statistical estimations such as correlation and testing hypothesis.																				
D1. Communicate about a subject clearly																√				
D2. Apply numerical and IT skills with confidence and accuracy.																	√			
D3. Take responsibility for self-managed learning																				
D4. The capacity to work with a strong																				

sense of direction and creativity.																				
D5. communicate effectively and professionally by written and graphical form.																		√		
D6. Collect, record, analyze and interpret data from a range of sources.																				

Course - Programme ILOs Matrix (Curriculum Map)

Course title	Intended learning outcomes ILOs																			
	KU				I						P				T					
	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D1	D2	D3	D4	D5	D6
Comparative Anatomy of Invertebrates		√				√	√	√	√			√	√		√		√			√
Invertebrate Embryology				√		√	√	√	√						√		√			√
Invertebrate Phylogeny	√		√			√	√	√	√		√		√		√		√			√
Biostatistics					√		√	√		√				√	√		√		√	√
Computer										√			√	√	√	√	√	√	√	√
thesis					√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

B. Course Specification

Course Title	**Histology**	
Course Code		
Academic Year	**2014/2015**	
Coordinator	**Prof. Ahlam A. Abou Shafey**	
Other Staff		
Level	Graduate-MSc	
Semester	One acdemic year	
Pre-Requisite		
Course Delivery	**Lecture**	28 x 2h lectures
	Practical	28 x 2h practicals
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

This module is in two halves:

- Provide students with adequate theoretical knowledge and professional skills in systemic animal tissues.
- Illustrate the advanced techniques in studying tissues.
- Create the ability to read and comment on electron microcopy observation.
- Acquire the ability to continuing research enhancement in the field of histology.

2. Intended Learning outcomes

A. Knowledge and understanding:

Upon successful completion of this course the student should be able to:

A1. Describe the normal histological features(lm) and ultra-structure(tem) of various body systems (digestive, endocrine respiratory, urinary, circulatory.

A2. describe and distinguish structural features of histological organs, regions and cell types present in each system and relate the structural variations to differences in organ function.

A3. explain the physiological, ultrastructural and specialized function of different cell types in different organ of the body

B. Intellectual skills:

They will also acquire the ability to

B1. Correlate between histological structure, ultra-structure and function of different tissues and organs of all studied mammalian systems.

C. Professional and practical skills:

C1. analyse, summarise and integrate information critically from a variety of media.

C2. recognize & distinguich between different organs in histological slides seen under the microscope.

C3. correlate the organs in each system with their function.

D. General and transferable skills:

D1. use the internet and other electronic sources as a source of information.

D2. develop team work skills and conduct lab investigation in a safe and ethical manner.

D3. communicate effectively with the colleagues as well as the employes and staff members.

3. Contents

Part - 2	**Histology**
Lectures 1,2	Circulatory system (blood vascular and lymphatic systems). Blood vascular system, histological structure of heart wall, and general structure of blood vessel wall.
Lectures 3,4	Arteries and veins; (large, medium-sized and small), blood capillaries, sinusoids and a-v anastomosis.
Lectures 5,6	Endocrine system, introduction, distribution of endocrine glands, 1) pituitary gland: a- adenohypophysis, histological structure and explain cell types of sth, lth, tsh, gth, acth and

	msh cells, sites and function.
Lectures 7,8	B- neurohypophysis of pituitary gland (pars nervosa), types of its nerve fibres and cells. 2) thyroid gland (lm&tem): follicular cells, parafollicular cells and interfollicular cells, and 3) parathyroid gland (chief and oxyphil cells), sites and functions.
Lectures 9,10	4) Adrenal glands (lm & tem):a- adrenal cortex (zona glomerulosa, zona fasciculata and zona reticularis). B- adrenal medulla (types of chromaffin cells:adrenaline and nor adrenaline cells.
Lectures 11,12	Integument; skin and appendages. Types, sites and structure of skin, hairs, hair follicles and nails.
Lectures 13,14	Color of skin, skin glands; sweat and sebaceous glands.
Lectures 15,16	Digestive system, oral cavity; lip, tongue, palate and pharynx.
Lectures 17,18	Alimentary tract; esophagus, stomach, small and large intestine.
Lectures 19,20	Digestive glands; salivary glands, liver and pancreas.
Lectures 21,22	Urinary system(lm & tem); kidney, nephron, collecting tubules, and blood–renal barrier.
Lectures 23,24	Juxta-glomerular apparatus, ureter, urinary bladders and urethra.
Lectures 25,26	Respiratory system:1)conducting portion: nasal cavity (naso-pharynx and larynx), trachea and respiratory epithelium.
Lectures 27,28	Lung, lm & tem (bronchi & terminal bronchiols), 2)respiratory portion (respiratory bronchioles, alveolar duct & sacs, alveoli, pneumocytes (type i & ii), alveolar macrophages and blood-air barrier.
Weeks 29,30 Weeks 31,32	**Assessment**

4. Teaching and Learning Methods

- Lectures.
- Practical Classes.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Course notes and Laboratory manual authorized by the Council of Department of Zoology.

Essential Books:

7. Facilities required for teaching and learning

- Projectors; Video and Overhead Projectors.
- Computer Presentations and Writing Boards.
- Microscopes; Compound and Stereoscopic.
- Museum Models.
- Scientific films and CDs.
- Library.

	Course Coordinator	Head of Department
Name	Prof. Ahlam A. Abou Shafey	Prof. Nabil Kamal El Fiky
Name (Arabic)	أ. د. أحلام السيد أبو شافعى	أ. د. نبيل كمال الفقى
Signature	…………………………..	………………………………..
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs									
	KU			I	P			T		
	A1	A2	A3	B1	C1	C2	C3	D1	D2	D3
Circulatory system	√	√	√							
Arteries and veins	√	√	√							
Endocrine system	√	√	√							
B- neurohypophysis of pituitary gland (pars nervosa)	√	√	√							
4) Adrenal glands (lm & tem)	√	√	√							
Integument	√	√	√							
Color of skin, skin glands	√	√	√							
Digestive system, oral cavity	√	√	√							
Alimentary tract; esophagus	√	√	√							
Digestive glands	√	√	√	√						
Urinary system(lm & tem)	√	√	√	√						
Juxta-glomerular apparatus, ureter, urinary bladders and urethra.	√	√	√	√						
Respiratory system	√	√	√	√						
Lung, lm & tem (bronchi & terminal bronchioles)	√	√	√	√						
Practical part					√	√	√	√	√	√

Course Title	**Comparative Anatomy of Invertebrates**	
Course Code	**1642**	
Academic Year	**2014/2015**	
Coordinator	**Dr. Amal Iskander Khalil**	
Other Staff	**Dr. Mohamad Mona, Dr. El Sayed Taha, Dr. Khadega Sharshar**	
Semester	**Continuous academic year**	
Level	**Graduate-MSc**	
Pre-Requisite	**B. Sc, and equivalent degrees**	
Course Delivery	**Lecture**	**28 x 2h lectures**
	Practical	**28 x 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

The overall aim of the course is :

- To enable students to acquire principles, practices and informative knowledge concerning diversity and variations in the structures and functions of different anatomical and histological systems which in turn reflects biological diversities of free living and parasitic invertebrates with special reference on those in the Egyptian environment.

- To develop awareness of concepts underlying identification and differentiation of different taxa.

- To develop intellectual and practical skills to develop professional competence in the fields related to biodiversity, invertebrates and parasitology.

2. Intended Learning outcomes

A. Knowledge and understanding:

Upon successful completion of this course students should be able to:

A1. Define the principles, concepts and terminology of structural taxonomy.

A2. Recognize the diversity of invertebrates as expressed in their their morphology, anatomy, ultrastucture, biology and life cycles.

A3. Indicates advanced techniques used in comparison between individuals of different taxa. indicate

A4. Explains the mechanisms underlying structural variations and modifications within different taxa.

B. Intellectual skills:

Upon successful completion of the course students should be able to:

B1. Demonstrate ability to differentiate between members of different taxa of invertebrates, in view of their comparative morphology, anatomy, ultrastucture and biology.

B2. Predict keys for differentiation between taxa.

B3. Distinguish closely related individuals which may serve as laboratory models.

B4. Evaluate environmental and evolutionary factors involving structural diversity within invertebrates.

C. Professional and practical skills:

Upon successful completion of the course students should be able to:

C1. Identify differentially between individuals within different taxa.

C2. Detect structural variations within and between different taxa.

C3. Present a professional report concerning structural variations among examined invertebrates.

D. General and transferable skills:

Upon successful completion of the course students should be able to:

D1. Use information technology tools effectively to integrate information from a verity of scientific view points and contexts, and exercise independent thought and judgment.

D2. Work independently as well as in a multidisciplinary team to reach a target for professional development.

D3. Become capable of independent continuous learning.

Contents:

Part - 1

Lectures 1 Course specifications, objectives and introduction.

Lecture 2	Basic Concepts and Definitions.
Lecture 3	Comparative anatomy of different taxa:

study includes anatomy, histology and ultrastructure as they relate to the function of different systems (body wall and skeletal system; digestive system, food gathering and digestion; excretory system and excretion; respiratory system and respiration; circulatory system; nervous and neuro-endocrine systems and sense organs; immune system; reproductive system, reproduction, development and life cycle). The study gives special attention to taxa specific characteristics, and modifications of different structures.

Lecture 4	Animal Kingdom -Lower Non-coelomate Invertebrates:
Lecture 5	Phylum Cnidaria 1
Lecture 6	Phylum Cnidaria 2
Lecture 7	Phylum Ctenophora
Lecture 8	Phylum Platyhelminthes: Turbellaria
Lecture 9	Phylum Platyhelminthes: Digenea
Lecture 11	Phylum Platyhelminthes: Monogenea
Lecture 12	Phylum Platyhelminthes: Cestoda
Lecture 13	Phylum Rotifera
Lecture 14	Phylum Nematoda
Lecture 15	Phylum Acanthocephala
Lecture 16	Higher Coelomate Invertebrate
Lecture 17	Phylum Annelida 2
Lecture 18	Phylum Arthropoda: The Crustacea 1
Lecture 19	Phylum Arthropoda: The Crustacea 2
Lecture 20	PhylumArthropoda: Myriapoda
Lecture 21	Phylum Mollusca 1

Lecture 22	Phylum Mollusca 2
Lecture 23	Phylum: Chaetognatha
Lecture 24	Phylum Echinodermata
Lecture 25	Phylum Protochordata
Lecture 26	Seminar 1
Lecture 27	Seminar 2
Lecture 28	Seminar 3

Part - 2

Lecture 1	Course specifications, objectives and introduction. Basic Concepts and Definitions.
Lecture 2	Research skills and scientific writing
Lecture 3	Comparative anatomy of different taxa: The study includes anatomy, histology and ultrastructure as they relate to the function of different systems (body wall and skeletal system; digestive system, food gathering and digestion; excretory system and excretion; respiratory system and respiration; circulatory system; nervous and neuro-endocrine systems and sense organs; immune system; reproductive system, reproduction, development and life cycle). The study gives special attention to taxa specific characteristics, and modifications of different structures. Protozoa
Lecture 4	Animal Kingdom -Lower Non-coelomate Invertebrates: Phylum Porifera
Lecture 5	Phylum Cnidaria 1
Lecture 6	Phylum Cnidaria 2
Lecture 7	Phylum Ctenophora
Lecture 8	Phylum Platyhelminthes: Turbellaria
Lecture 9	Phylum Platyhelminthes: Digenea

Lecture 10	Phylum Platyhelminthes: Monogenea
Lecture 11	Phylum Platyhelminthes: Cestoda
Lecture 12	Phylum Rotifera
Lecture 13	Phylum Nematoda
Lecture 14	Phylum Acanthocephala
Lecture 15	Higher Coelomate Invertebrates, Phylum Annelida 1, Phylum Annelida 2
Lecture 16	Phylum Arthropoda: The Crustacea 1
Lecture 17	Phylum Arthropoda: The Crustacea 2
Lecture 18	PhylumArthropoda: Myriapoda
Lecture 19	Phylum Mollusca 1
Lecture 20	Phylum Mollusca 2
Lecture 21	Phylum: Chaetognatha
Lecture 22	Phylum Echinodermata
Lecture 23	Phylum Protochordata
Lecture 24	Seminar 1
Lecture 25	Seminar 2
Lecture 26	Seminar 3
Lecture 27	Paper presentation
Weeks 28, 29	**Assessment**

Practical part

Class	Subject	Week
1	Microscope, calibration, orientation and safety	1
2	Specimen collection, processing and examination	2
3	Morphological, anatomical and microscopic examination of representative of different groups- objectives, principles and methods of assessment.	3

4	*Phylum Porifera (Sponges)*	4
5	Phylum Cnidaria :Hydrozoa, Scyphozoa, Cubozoa, Anthozoa	5
6	*Phylum Ctenophora : Comb-jellies*	6
7	*Comparative review*	7
8	*Phylum Platyhelminthes: Turbellari and Digenea*	8
9	*Phylum Platyhelminthes: Monogenea*	9
10	*Phylum Platyhelminthes:Cestoda*	10
11	*Comparative review*	11
12	*Phylum Acanthocephala*	12
13	*Phylum Nematoda*	13
14	*Comparative review*	14
15	*Phylum Annelida 1*	15
16	*Phylum Annelida 2*	16
17	*Phylum Arthropoda: The Crustacea*	17
18	Phylum Arthropoda: :Myriapoda	18
19	*Comparative review*	19
20	*Phylum Mollusca*	20
21	Phylum Mollusca	21
22	*Phylum: Chaetognatha*	22
23	Phylum Echinodermata	23
24	*Phylum: Protochordata*	24
25	Comparative review	25
26	Molluscs of medical importance	26
27	Crustaceans of medical importance	27
28	Revision	28

Teaching and Learning Methods

Lectures: Formal lecturing including visual presentations using overhead projectors, slide projector, PowerPoint presentations, blackboard and chalk, and seminars.

Practical classes: Including laboratories and experimental studies using prepared microscopic slides and specimens.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 32nd Week	60%
Practical Examination	P, I	2 Hour Examination	The 30th Week	40%

KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

List of references

6.1 .Course handouts.

6.2. Essential Books:

Soliman, G. N. 2001. "Invertebrate Zoology - The Mideastern Invertebrate Fauna. Pt II. The Coelomates". The Palm Press, Cairo, pp. 520.

Soliman, G. N. 2006. "Invertebrate Zoology - The Mideastern Invertebrate Fauna. Pt I second edition. The Noncoelomates". The Palm Press, Cairo, pp. 350.

6.3.Recommended Books.

Barnes, R.S.K. 1984. Kingdom Animal. In A Synoptic Classification of Living Organisms. Ed. R.S.K. Barnes. Blackwell Scientific Publications.

Beklemishev, W. N., 1969. Principles of Comparative Anatomy of Invertebrates: Edinburgh, Oliver and Boyd.

Harrison, F.W. and Westfall, J.A. (Eds.) 1991. Microscopic anatomy of invertebrates, Volume 2: Placozoa, Porifera, Cnidaria, and Ctenophora. Wiley-Liss, New York

Mehlhorn, H. 1988. Parasitology in Focus. Facts and Trends. Springer-Verlag Berlin Heidelberg.

Olsen, O.W. Animal Parasites 1986. Their Life Cycles and Ecology. Baltimore University Park. Press.

Web sites:

http://www.eeescience.utoledo.edu/Faculty/Gottgens/EEES%202160/Lab%2012%20Invertebrates.pdfhttp://waterkid.net/Portfolio_Documents/Invert_Comparative_Anatomy_Lab.pdf

"Comparative Anatomy," Microsoft® Encarta® Online Encyclopedia 2008.

http://encarta.msn.com © 1997-2008 Microsoft Corporation.

http://encarta.msn.com/encyclopedia_761586788/Comparative_Anatomy.html. Accessed January 13, 2009

Biology 3020. Introduction to Evolution. California State University Stanislaus Winter 2009. Dr. Steven J. Wolf. http://arnica.csustan.edu/biol3020/anatomy/anatomy.htm. Accessed January 13, 2009

7. Facilities required for teaching and learning

Projectors: Data show, overhead, and slide projectors.

Laboratory well equipped with internet connection.

Computer presentations and writing boards

Microscopes; compound and stereoscopic.

Microscopic mounted preparations.

Live animals for dissection and examination.

Ocular and stage micrometers.

USB microscopes.

Camera Lucida.

Scientific films and CDs, Library

	Course Coordinator	Head of Department
Name	Amal Iskander Khalil	Prof. Nabil Kamal Elfiki
Name (Arabic)	أ.د. آمـــال إسكـندر عبـد المـلك خليـل	أ. د.نبيل كمال الفقى
Signature		
Date	9-2014	9-2014

Course title	Intended learning outcomes ILOs													
	KU				I				P			T		
	A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	C 1	C 2	C 3	D 1	D 2	D 3
Basic Concepts and Definitions.	√													
Research skills and scientific writing												√		
Comparative anatomy of different taxa		√		√				√						
Animal Kingdom - Lower Non-coelomate Invertebrates		√			√				√	√				
Phylum Cnidaria 1		√			√				√	√				
Phylum Cnidaria 2		√			√				√	√				
Phylum Ctenophora		√			√				√	√				
Phylum Platyhelminthes: Turbellaria		√			√				√	√				
Phylum Platyhelminthes: Digenea		√			√				√	√				
Phylum Platyhelminthes: Monogenea		√			√				√	√				
Phylum Platyhelminthes: Cestoda		√			√				√	√				
Phylum Rotifera		√			√				√	√				

Phylum Nematoda		√			√				√	√				
Phylum Acanthocephala		√			√				√	√				
Higher Coelomate Invertebrates2		√			√				√	√				
Phylum Arthropoda: The Crustacea 1		√			√				√	√				
Phylum Arthropoda: The Crustacea 2		√			√				√	√				
PhylumArthropoda : Myriapoda		√			√				√	√				
Phylum Mollusca 1		√			√				√	√				
Phylum Mollusca 2		√			√				√	√				
Phylum: Chaetognatha		√			√				√	√				
Phylum Echinodermata		√			√				√	√				
Phylum Protochordata		√			√				√	√				
Seminar 1		√			√	√		√	√	√	√			
Seminar 2		√			√	√		√			√			
Seminar 3		√			√	√		√			√			
Paper presentation		√			√	√		√			√		√	√
Practical content					√									
Microscope, calibration, orientation and safety			√		√									

Specimen collection, processing and examination			√		√									
Morphological, anatomical and microscopic examination		√	√		√		√							
Phylum Porifera (Sponges)			√		√				√	√				
Phylum Cnidaria			√		√				√	√				

Phylum Ctenophora : Comb-jellies			√		√				√	√				
Comparative review			√		√				√	√				
Phylum Platyhelminthes: Turbellari and Digenea			√		√				√	√				
Phylum Platyhelminthes: Monogenea			√		√				√	√				
Phylum Platyhelminthes:Cestoda			√		√				√	√				
Comparative review			√		√				√	√				
Phylum Acanthocephala			√		√				√	√				
Phylum Nematoda			√		√				√	√				
Comparative review			√		√	√			√	√				
Phylum Annelida 1			√		√				√	√				
Phylum Annelida 2			√		√				√	√				
Phylum Arthropoda: The Crustacea			√		√				√	√				
Phylum Arthropoda: :Myriapoda			√		√				√	√				
Comparative review			√		√				√	√				
Phylum Mollusca			√		√				√	√				
Phylum Mollusca			√		√				√	√				

Phylum: Chaetognatha			√		√				√	√				
Phylum Echinodermata			√		√				√	√				
Phylum: Protochordata			√		√				√	√				
Comparative review			√		√	√			√	√				
Molluscs of medical importance			√		√				√	√				
Crustaceans of medical importance			√		√				√	√				
Revision					√				√	√				

Course Title	**Invertebrate Embryology**	
Course Code	**1643**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Samia Hanim Hameem Eissa**	
Other Staff	**Prof. Mohamed Mona, Prof. Fayez Shoukr, Prof. Ibrahim Bakr.**	
Semester	**One continuous academic year**	
Level	**Graduate – MSc**	
Pre-Requisite		
Course Delivery	**Lecture**	**28 × 2h lectures**
	Practical	**28 × 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**9-2014**	

1. Aims

The course in embryology emphasizes the development of invertebrates to provide the student with a solid foundation of the major principles of development and comparative patterns of invertebrate embryology. The student will master the basics of development from gametogenesis, fertilization, cleavage and early development, histogenesis, organogenesis to hatching, metamorphosis or birth. These topics will be approached from both the structural point of view of classical embryology and the more recent molecular mechanistic viewpoint. The course will focus on comparative mechanisms of development and will examine the development of a variety of invertebrate embryos. So, the student will be able to make comparisons of the development of various life forms, noting similarities and differences, relating them to the evolutionary concept.

2. Intended Learning outcomes

A. Knowledge and understanding :

Upon successful completion of this course students should be able to :

A1. describe the process of gamete production, fertilization and the major events that characterize the early stages of animal development.

A2. explain of how genetic information is used to produce different cell types.

A3. clarify the general pattern of development in representative invertebrate groups.

B. Intellectual skills :

They will also acquire the ability to :

B1. Distinguish between the different stages of animal development and estimate the required time for each stage.

B2. compare of the development of various life forms in representative invertebrate groups.

B3. compare between the different groups and relating them to the evolutionary concept.

B4. analyse the problem of growth, and develop an understanding of factors that influence and regulate cell division.

C. Professional and practical skills :

C1. dissect invertebrate animals to collect and preserve mature gametes.

C2. perform in vitro fertilization.

C3. design experiments involved in studying developmental processes.

C4. examine and draw prepared slides and models of each developmental stage.

D. General and transferable skills :

D1. use the internet and other electronic sources as a source of information.

D2. analyze information needed for solving a problem.

D3. communicate ideas and concepts verbally and in writing.

3. Content

Lecture 1	Course specification, objectives and the syllabus.
Lecture 2	Course introduction, what is embryology. Basic pattern of embryogenesis, (protostomes and deuterostomes).
Lecture 3	Principles of experimental embryology. Fundamental points in growth and development.
Lecture 4	Common features of sex cell differentiation. Gametogenesis : Oogenesis. Types of eggs.
Lecture 5	Spermatogenesis, ultrastructure of mature sperm. Types of sperms, sperm dimorphism.
Lecture 6	Discharge and union of sex cells. Ovulation, semination, fertilization (Beginning a new organism).

Lecture 7	Types of cleavage, blastulation and blastomere specification. Gastruclation and fate maps.
Lecture 8	Early development of selected invertebrates : Phylum Protozoa : Types of reproduction, normal development.
Lecture 9	Phylum Porifera : types of reproduction, Normal development.
Lecture 10	Phylum Cnidaria, Class Hydrozoa : Egg stage, cleavage and germ layer formation.
Lecture 11	Class Scyphozoa : egg stage, cleavage and germ layer formation.
Lecture 12	Class Anthozoa : egg stage, cleavage and germ layer formation.
Lecture 13	Phylum Ctenophora : The shape and structure of egg, and normal development.
Lecture 14	Phylum Platyhelminthes : structure of egg, fertilization, laying, cleavage, normal development and regeneration. Class : Turbellaria.
Lecture 15	Phylum Platyhelminthes, Class : Digenea
Lecture 16	Phylum Platyhelminthes, Class : Monogenea
Lecture 17	Phylum Platyhelminthes, Class : Cestoda
Lecture 18	Phylum Nemata : Reproduction, development and life cycle.
Lecture 19	Phylum Annelida : Organization of the egg, fertilization, segmentation and early development.
Lecture 20	Phylum Mollusca : Class Bivalvia : The ovarian egg, the mature eggs, Normal development.
Lecture 21	Phylum Mollusca : Class Gastropoda : Ovoposition, Oogenesis, cleavage and gastrulation. Embryogenesis and organogenesis.
Lecture 22	Phylum Mollusca : Class Cephalopoda : Structure of the egg and its accessory coats. Structure and function of the spermatophore. Fertilization and early development cleavage.
Lecture 23	Class Cephalopoda : Development of the germ layers and organogenesis.
Lecture 24	Phylum Arthropoda : Class Crustacea : The egg and its segmentation, types of eggs, oogenesis.
Lecture 25	Class Crustacea : Formation of the germ layers and organogeny.

Lecture 26	Phylum Echinodermata : Echinoids, normal development, cell lineage, animalization and vegetalization.
Lecture 27	Sex determination, metamorphosis and regeneration.
Lecture 28	Environmental regulation of animal development.
Assessment	

Lab. Sequence

1	Embryological tools
2	Using the compound microscope Gametogenesis
3	Handling and care of animals. Methods of obtaining gametes.
4	Preparing a pure sperm suspension. Preparing artificial seawaters.
5	Fertilization & culturing (Echinoid fertilization).
6	Embryo culture & larval growth.
7,8,9	Experimental investigations of sea-urchin development [vegetalization and animalization phenomena].
10	The living embryo and making of whole mounts.
11	Staining with different whole mount stains.
12,13,14	Histological techniques.
15	Parthenogenic activation of sea urchin eggs.
16-27	Applying previous methods on selected examples of invertebrate animals as: Hydra sp. Planaria sp., Daphnia sp., Artemia sp., Freshwater crayfishes, Freshwater snails.
28	Revision

4. Teaching and Learning Methods

- Lectures .

- practical classes.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

* KU : Knowledge and Understanding, I : Intellectual, P: Professional, T: Transferable.

6. List of references

Essential Books:

- **Gilbert, S.F. 2006.** "Developmental Biology". Sinauer Associates : Sunderland.

- **Johnson, L.G. 2001**. "Patterns & experiments in Developmental Biology". 3rd ed.; McGraw Hill : New York.
- **Kume, M. and Dan, K. 1968**. "Invertebrate Embryology". Bai Fu Kan Press, Tokyo.
- **Reverberi, G. 1971**. "Experimental embryology of marine and freshwater invertebrates". North-Holland Publishing Company, Amsterdam. London.
- **Saunders, J.W. 1970**. "Patterns and principles of animal development". Collier macmillan Publishers, London.
- **Soliman, G.N. 2006**. "Invertebrate Zoology – The Mideastern Invertebrate fauna. Pt I. second edition. The noncoelomates". The Palm Press, Cairo, pp. 350.

Web sites:

- http://www.devbio.com.
- http://www.ucalgary.ca/u of c/ eduweb/ virtualembryo /dbtutorial. html.

7. Facilities required for teaching and learning

Projectors : Data show, overhead, and slide projectors. Microscopes; compound and stereoscopic.

Live animals for dissection and collecting gametes. Prepared slides and prepared models for gametogenesis and different stages of development. Scientific films and CDS. Library.

	Course Coordinator	**Head of Department**
Name	Prof. Samia Hanim Hameem Eissa	Prof. Nabil Kamal Elfiki
Name (Arabic)	أ.د/ سامية هانم حميم عيسى	أ. د.نبيل كمال الفقى
Signature		
Date	9-2014	9-2014

Course title	Intended learning outcomes ILOs														
	KU			I				P				T			
	A 1	A 2	A 3	B 1	B 2	B 3	B 4	C 1	C 2	C 3	C 4	D 1	D 2	D 3
introduction		√												
Principles of experimental embryology		√												
Common features of sex cell differentiation. Gametogenesis : Oogenesis. Types of eggs.	√													
Spermatogene sis	√													
Discharge and union of sex cells.	√													
Types of cleavage, blastulation and blastomere specification. Gastruclation and fate maps.	√			√										
Early development of selected invertebrates	√		√		√	√								
Phylum Porifera : types of reproduction, Normal			√		√	√								

development.														
Phylum Cnidaria, Class Hydrozoa : Egg stage, cleavage and germ layer formation.			√		√	√								
Class Scyphozoa : egg stage, cleavage and germ layer formation.			√		√	√								
Class Anthozoa : egg stage, cleavage and germ layer formation.			√		√	√								
Phylum Ctenophora : The shape and structure of egg, and normal development.			√		√	√								
Phylum Platyhelminthes : structure of egg, fertilization, laying, cleavage, normal development and regeneration. Class : Turbellaria.			√		√	√								

Phylum Platyhelminthes, Class : Digenea			√		√	√								
Phylum Platyhelminthes, Class : Monogenea			√		√	√								
Phylum Platyhelminthes, Class : Cestoda			√		√	√								
Phylum Nemata : Reproduction, development and life cycle.			√		√	√								
Phylum Annelida : Organization of the egg, fertilization, segmentation and early development.			√		√	√								
Phylum Mollusca : Class Bivalvia : The ovarian egg, the mature eggs, Normal development.			√		√	√								
Phylum Mollusca : Class Gastropoda : Ovoposition,			√		√	√								

Oogenesis, cleavage and gastrulation. Embryogenesis and organogenesis.														
Phylum Mollusca : Class Cephalopoda : Structure of the egg and its accessory coats. Structure and function of the spermatophore . Fertilization and early development cleavage.			√		√	√								
Class Cephalopoda : Development of the germ layers and organogenesis.			√		√	√								
Phylum Arthropoda : Class Crustacea : The egg and its segmentation, types of eggs, oogenesis.			√		√	√								
Class Crustacea : Formation of the germ layers and			√		√	√								

organogeny.														
Phylum Echinodermata : Echinoids, normal development, cell lineage, animalization and vegetalization.			√		√	√								
Sex determination, metamorphosis and regeneration.			√		√	√							**√**	**√**
Environmental regulation of animal development.							√							
Embryological tools														
Using the compound microscope Gametogenesis														
Handling and care of animals. Methods of obtaining gametes.								√						
Preparing a pure sperm suspension.									√					

Preparing artificial seawaters.														
Fertilization & culturing (Echinoid fertilization).									√					
Embryo culture & larval growth.										√	√	√	√	
Experimental investigations of sea-urchin development [vegetalization and animalization phenomena].										√	√	√	√	
The living embryo and making of whole mounts.										√	√	√	√	
Staining with different whole mount stains.										√	√	√	√	
Histological techniques.										√	√	√	√	
Parthenogenic activation of sea urchin eggs.										√	√	√	√	
Applying previous methods on selected examples of invertebrate										√				

animals as: Hydra sp. Planaria sp., Daphnia sp., Artemia sp., Freshwater crayfishes, Freshwater snails.														
Revision												√	√	√

Course Title	**Invertebrate Phylogeny**	
Course Code	**1644**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Fayez shoukr**	
Other Staff	**Prof. Amal Eskander, Dr. Hoda Kamal, Dr. Nahla Omran**	
Semester	**Semester – 1&2**	
Level	**Graduate-MSc pre-requisit**	
Pre-Requisite	**B. Sc, and equivalent degrees**	
Course Delivery	**Lecture**	**28 x 2h lectures**
	Practical	**28 x 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**September,2014**	

1. Aims

The objectivs of invertebrate phylogeny course is

- To understand the modern theories of Phylogeny based on morphological and molecular characters along cladogrms or phylgenetic trees.

- Classification based strictly on morphology, primarily types of body cavities, development, larval forms, segmentation, etc.

- Know the molecular phylogenetic trees and study the genes (DNA and RNA) contained within animal cells

- Learn the fundamentals of phylogenetic analysis, including how to assemble a dataset of taxonomic characters, including morphological and molecular characters with the way in which molecular techniques can be used to explore evolutionary relationships.

- Give a survey of the invertebrates with emphasis on evolutionary relationships within, between, and among constituent phyla.

2. Intended Learning outcomes

A. Knowledge and understanding:

Upon successful completion of this course the student should be able to:

A1. explain the phylogenetic tree of the Kingdom Animalia.

A2. recognize that the Anthozoa appear to be basal within Cnidaria .

A3. mention that the Protostomates appear to be divided into two major clades: Ecdysozoa and Lophotrochozoa. Annelida and Arthropoda belong to Lophotrochozoa and Ecdysozoa, respectively, and are therefore not closely related.

A4. state that the Lophotrochozoa, include animals with trochophore larvae and feeding organ called lophophore. Flatworms appear to be lophotrochozoans rather than basal to other Bilateria.

A5. indicate that the Ecdysozoa include animals that molts.

A6. clarify the molecular evidence which supports the conventional phylogeny of

echinoderm classes that Concentricycloids may be asteroids.

B. Intellectual skills:

Upon successful completion of this course the student should be able to:

B1. distinguish the evolutionary relationships that link the invertebrate

animal phyla.

B2. analyse that a character which is consistent with both a morphological and a molecular phylogeny is more likely to be phylogenetically informative.

B3. Summarize the molecular phylogeny of the Animal Kingdom.

C. Professional and practical skills:

Upon successful completion of this course the student should be able to:

C1. collect and preserve invertebrates of the local fauna.

C2. perform the skills required for Identification and description of the

taxonomic groups of local organisms from more primitive (simple) to more advanced (complex) along a cladogrma or phylgenetic tree.

C3. use the basic features of animal design with a preliminary insight into invertebrate phylogeny.

D. General and transferable skills:

They will also acquire the ability to:

D1. use PC ,the internet and the electronic library for writing scientific essays and

give oral presentation or Posters.

D2. work effectively with other as a part of a team to collect data and visual

forms

D3. become capable of Self-learning with update continuous learning.

D4. solve problems relating to the phylogenetic tree of the Kingdom Animalia.

3. Content

Lectures

Lecture 1	Course specifications& objectives Introduction to Invertebrate Phylogeny.
Lecture 2	Phylogeny of living organisms (Phylogenetic Tree of Life). Phylogenetic tree or dendrogram of Kingdom Animalia (Animal Phylogeny).
Lecture 3	Morphological characters of body plan traditionally used in invertebrate Phylogeny. : Symmetry, germ layers,body cavity,coelom,
Lecture 4	Morphological characters of body plan traditionally used in invertebrate Phylogeny. : mouth origin, cleavage .
Lecture 5	Molecular phylogeny of the animal kingdom. New look in invertebrate Phylogeny based on Molecular characters.
Lecture 6	Teaching Animal Molecular Phylogenetics
Lecture 7	Protista Kingdom - Protistan Phylogeny
Lecture 8	Phylogeny of Protozoa.
Lecture 9	Animal Kingdom -Lower Non-coelomate Invertebrates:
	Parazoa- Porifera (sponges).
Lecture 10	Phylogenetic relationships & of Sponges.
Lecture 11	Metazoa- Origin of Metazoa -
Lecture 12	Theory of multicelluarity (Colonial Theory & Syncytial theory).
Lecture 13	Radiata - Phylogeny of Radiate Phyla (Cnidaria and Ctenophora): - Phylogenetic Relationships of Cnidaria based on morpholgical characters.
Lecture 14	Molecular Phylogeny of Cnidaria.
Lecture 15	Phylogeny of the Phylum Ctenophora The comb jellies.
Lecture 16	Bilateria - Phylogeny of Bilaterian Phyla :
Lecture 17	Phylogeny of the Phylum Platyhelminthes (flatworms).

Lecture 18	Phylogeny of the Phylum Nematoda (Nemata).
Lecture 19	Phylogeny of the Phylum Nematoda (Nemata).
Lecture 20	Higher Coelomate Invertebrates (Protostomes): The Lophotrochozoa - Edysozoa Dichotomy The "Lophotrochozoa"
Lecture 21	Phylogeny of the Phylum Mollusca.
Lecture 22	Phylum Annelida.
Lecture 23	The "Ecydysozoa" Arthropods.
Lecture 24	The "Ecydysozoa" Arthropods.
Lecture 25	Higher Coelomate Invertebrates (Deuterostomes): Phylum Echinodermata.
Lecture 26	Guidelines for writing Master thesis and research papers in Invertebrates.
Lecture 27	Using the internet, multimedia & presentation methods in Invertebrates.
Lecture 28	Paper Discussion (a journal article).
Assessmen	

Laboratory Schedule

Lab. 1	Introduction to laboratory Study.
Lab. 2	Collection and Preservation of Invertebrates.
Lab. 3	Identification of Invertebrates.
Lab. 4	Protista Kingdom - Protozoa.
Lab. 5	Protista Kingdom - Protozoa.
Lab. 6	Protista Kingdom - Protozoa.
Lab.7	Animal Kingdom Parazoa- Phylum Porifera (sponges).
Lab. 8	Phylum Porifera (sponges).
Lab. 9	Radiata - Phylum Cnidaria.
Lab.10	Phylum Cnidaria.

Lab. 11	Phylum Cnidaria.
Lab. 12	Phylum Ctenophora The comb jellies.
Lab. 13	Bilateria - Phylum Platyhelminthes (flatworms).
Lab. 14	Phylum Platyhelminthes (flatworms).
Lab.15	Phylum Platyhelminthes (flatworms).
Lab. 16	Phylum Nematoda (Nemata).
Lab. 17	Phylum Nematoda (Nemata).
Lab. 18	Higher Coelomate Invertebrates.(Protostomes): The "Lophotrochozoa" Phylum Mollusca.
Lab. 19	Phylum Mollusca.
Lab. 20	Phylum Mollusca.
Lab. 21	Phylum Annelida.
Lab. 22	Phylum Annelida.
Lab. 23	The "Ecydysozoa" Arthropods.
Lab. 24	The "Ecydysozoa" Arthropods.
Lab. 25	The "Ecydysozoa" Arthropods.
Lab. 26	Higher Coelomate Invertebrates (Deuterostomes): Phylum Echinodermata.
Lab. 27	Phylum Echinodermata.
Lab. 28,29,30	Revision.
Weeks 31,32	Assess.

4. Teaching and Learning Methods

4.1. Lectures using Laptop & Data show overhead projector and power point**.**

4.2. Practical classes using preserved or fresh specimens or photographs of rare specimens, museum specimens for different animals as well as microscopic slides.

4.3. Internet and library research for preparing an essay on specific topics related to the course with oral presentation.

4.4. Writing Reports for Practical classes.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 32th Week	60%
Practical Examination	P	2 Hour Examination	The 30th Week	40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

6.1 .course notes:

- Lectures notes - Authorized by Zoology Department, Faculty of Science, Tanta University, Egypt.
- Practical notes - Authorized by Zoology Department, Faculty of Science, Tanta University, Egypt.

6.2. Essential Books:

Soliman, G. N. 2001 "Invertebrate Zoology - The Mideastern Invertebrate Fauna. Pt II. The Coelomates". The Palm Press, Cairo, pp. 520.

Soliman, G. N. 2006 "Invertebrate Zoology - The Mideastern Invertebrate Fauna. Pt I second edition. The Noncoelomates". The Palm Press, Cairo, pp. 350.

6.3 . Recommended Books:

Willmer, P. 1990. Invertebrate Relationships: Patterns in animal evolution. Cambridge University press, Cambridge, 416 pages, ISBN-10: 0521337127

www.cambridge.org/us/9780521337120

Conway Morris, S. et al. 1985. The Origins and Relationships of Lower Invertebrates. New York: Oxford University Press.

Raven, Peter H.; Johnson, George B.; Singer, Susan R.; Losos, Jonathan B. (2004): Biology. McGraw-Hill Science/Engineering/Math, U.S.A. ISBN 10**:** 0072921641

Hillis, D. M., C. Moritz, and B. K. Mable (Eds). 1996. Molecular Systematics, 2nd Ed. Sunderland MA: Sinauer Assoc.

Ruppert, E. E., R. S. Fox, and R. D. Barnes. 2004. Invertebrate Zoology: A Functional Evolutionary Approach. 7th ed. Brooks/Cole – Thomson Learning, Inc., US.

6.4 . Periodicals (journals), Web sites, etc

Search Engines

http://www.google.com

http://www.alltheweb.com

Invertebrate **Systematics**

Invertebrate Systematics is an international ***journal*** publishing significant contributions and reviews on the systematics and ***phylogeny*** of ***invertebrate***

www.publish.csiro.au/nid/120.htm

Journal of Evolutionary Biology

www.blackwellpublishing.com/jeb_enhanced/Systematic Biology

http://www.utexas.edu/ftp/depts/systbiol/info/issues.html

Major Journals of Molecular Phylogenetics:

Journal of Molecular Evolution

http://link.springer.de/link/service/journals/00239/index.html

Molecular Biology and Evolution

http://www.molbiolevol.org/

Molecular Phylogenetics and Evolution

http://www.apnet.com/www/journal/fy.htm

Casey Dunn et al, 2008.Broad phylogenetic sampling improves resolution of the animal tree of life. Nature Online (5 March 2008) .

http://www.nature.com/

Adoutte, A. G. et al. 2000. The new animal phylogeny: reliability and implications. *Proc. Natl. Acad. Sci. USA* 97:4453-4456.

http://www.pnas.org/cgi/content/full/97/9/4453

Bridge, D. et al. 1992. Class-level relationships in the phylum Cnidaria: Evidence from mitochondrial genome structure. *Proc. Natl. Acad. Sci. USA* 89:8750-8753.

Bridge, D., C. W. Cunningham, R. DeSalle, and L. W. Buss. 1995. Class-level relationships in the phylum Cnidaria: Molecular and morphological evidence. *Mol. Biol. Evol*. 12:679-689.

Cavalier-Smith, T. M. et al. 1996. Sponge phylogeny, animal monophyly, and the origin of the nervous system: 18S rRNA evidence. *Can. J. Zool*. 74:2031-2045.

Field, K. G. et al. 1988. Molecular phylogeny of the animal kingdom. *Science* 239:748-753.

Smith, M. J., A. Arndt, S. Gorski, and E. Fajber. 1993. The phylogeny of echinoderm classes based on mitochondrial gene arrangements. J. Mol. Evol. 36:545-554.

7. Facilities required for teaching and learning

7.1 . Computer halls for Data show with laptop, video clips, films, overhead projector and transparence sheets.

7.2 . internet and well equipped laboratory with preserved specimens, dry or wet, living specimens, slides.

7.3 . course website.

Recommendations

1- Internet assignement with scientific Poster or ppt and Oral Presentations about specific topics related to the course. Each student will look up information on the internet. Throughout the course, data will be gathered. Posters or ppt will be presented orally during the last course.

2-Course Website: The course website contains all the information present in this syllabus plus additional resources including downloadable course notes, laboratory manuals, required and supplemental readings, animations, videoclips and announcements.

	Course Coordinator	**Head of Department**
Name	Prof. Fayez A. Shoukr	Prof. Nabil Kamal Elfiki
Name (Arabic)	أ. د. فايز عبد المقصود شكر	أ. د.نبيل كمال الفقى
Signature	…………………………..	………………………..
Date	9-2014	9/2014

contents	intended learning outcomes ILOs															
	KU						I			P			T			
	A 1	A 2	A 3	A 4	A 5	A 6	B 1	B 2	B 3	C 1	C 2	C 3	D 1	D 2	D 3	D 4
Course specifications& objectives Introduction to Invertebrate Phylogeny.	√															
Phylogeny of living organisms (Phylogenetic Tree of Life). Phylogenetic tree or dendrogram of Kingdom Animalia (Animal Phylogeny).	√						√	√								
Morphological characters of body plan traditionally used in invertebrate Phylogeny. : Symmetry, germ layers,body cavity,coelom,	√						√	√								
Morphological characters of body plan traditionally used in invertebrate Phylogeny. : mouth origin, cleavage .						√	√	√								
Molecular phylogeny of the animal kingdom.						√										

New look in invertebrate Phylogeny based on Molecular characters.																
Teaching Animal Molecular Phylogenetics																
Protista Kingdom - Protistan Phylogeny																
Phylogeny of Protozoa.								√								
Animal Kingdom - Lower Non-coelomate Invertebrates: Parazoa- Porifera (sponges).								√								
Phylogenetic relationships & of Sponges.								√								
Metazoa- Origin of Metazoa -		√						√								
Theory of multicelluarity (Colonial Theory & Syncytial theory).		√						√								
Radiata - Phylogeny of Radiate Phyla (Cnidaria and Ctenophora): - Phylogenetic Relationships of Cnidaria based on		√						√								

morpholgical characters.																
Molecular Phylogeny of Cnidaria.		√						√								
Phylogeny of the Phylum Ctenophora The comb jellies.		√						√								
Bilateria - Phylogeny of Bilaterian Phyla :								√								
Phylogeny of the Phylum Platyhelminthes (flatworms).								√								
Phylogeny of the Phylum Nematoda (Nemata).								√								
Phylogeny of the Phylum Nematoda (Nemata).								√								
Higher Coelomate Invertebrates (Protostomes): The Lophotrochozoa - Edysozoa Dichotomy The "Lophotrochozoa"			√	√				√								
Phylogeny of the Phylum Mollusca.								√								

Phylum Annelida.								√								
The "Ecydysozoa" Arthropods.				√	√			√								
The "Ecydysozoa" Arthropods.				√	√			√								
Higher Coelomate Invertebrates (Deuterostomes): Phylum Echinodermata.																
Guidelines for writing Master thesis and research papers in Invertebrates.																
Using the internet, multimedia & presentation methods in Invertebrates.													√		√	
Paper Discussion (a journal article).									√					√	√	√
Practical content																
Introduction to laboratory Study.																
Collection and Preservation of Invertebrates.										√	√					
Identification of Invertebrates.										√	√					
Protista Kingdom - Protozoa.								√			√					

Protista Kingdom - Protozoa.								√			√					
Protista Kingdom - Protozoa.								√			√					
Animal Kingdom Parazoa- Phylum Porifera (sponges).								√			√					
Phylum Porifera (sponges).								√			√					
Radiata - Phylum Cnidaria.								√			√					
Phylum Cnidaria.								√			√					
Phylum Cnidaria.								√			√					
Phylum Ctenophora The comb jellies.								√			√					
Bilateria - Phylum Platyhelminthes (flatworms).								√			√					
Phylum Platyhelminthes (flatworms).								√			√					
Phylum Platyhelminthes (flatworms).								√			√					
Phylum Nematoda (Nemata).								√			√					
Phylum Nematoda (Nemata).								√			√					
Higher Coelomate								√			√					

Invertebrates.(Pro tostomes): The "Lophotrochozoa" Phylum Mollusca.																
Phylum Mollusca.								√			√					
Phylum Mollusca.								√			√					
Phylum Annelida.								√			√					
Phylum Annelida.								√			√					
The "Ecydysozoa" Arthropods.								√			√					
The "Ecydysozoa" Arthropods.								√			√					
The "Ecydysozoa" Arthropods.								√			√					
Higher Coelomate Invertebrates (Deuterostomes): Phylum Echinodermata.								√			√					
Phylum Echinodermata.								√			√					
Revision.											√					

Course Title	**Biostatistics**	
Course Code	**1648**	
Academic Year	**2013/2014**	
Coordinator	**Prof. Abd-Elmoneim Anwar Mohamed**	
Other staff		
Level	**Preparatory level of MSC**	
Semester	**Semester**s	
Pre-Requisite	B. Sc. Zoology	
Course delivery	**Lecture**	**28 x 1h lectures**
	Practical	**-**
Parent Department	**Mathematics Department**	
Date of Approval	**September 2014**	

1. Aims

This module aims to

- provide M. Sc. students in biology with basic concepts of study design and data analysis suitable for laboratory and field research

- to help students to develop the skills needed to apply statistical methods using related statistical software; e.g. Primer or GraphPad in scientific biological research. Emphasis will be on practical and applied skills using example of relevance to biology students.

2. Intended Learning outcomes

A. Knowledge and understanding:

By the end of this course the students should be able to*:*

- A17. enumerate statistical measures for data description; statistical estimation; correlations and testing hypothesis.
- A18. mention the basic principles of study design.
- A19. describe the types of variables that are used in biological research.
- A20. explain the role of sampling variation, to quantify the variability, and its role in comparing groups or categories.

B. Intellectual skills:

B13. Discuss confidently simple essential statistical methods in biological research and to interpret results.
B14. select appropriate statistical methods for analysis of simple data sets and apply them on a computer using bio-statistical software, GraphPad.
B15. summarise data using graphical and tabular data.
B16. interpret research findings and explain them in a clear, concise and logical manner.

C. Professional and practical skills

C10. select and apply appropriate basic statistical methods for analysis of data.
C11. use GraphPad package in data analysis.
C12. tackle skills in handling data on a computer and otherwise, and deriving and presenting quantitative results using appropriate tables, figures, and summaries.

D. Transferable skills

D13. write report including graphical material.
D14. present and discuss the finding from statistical analysis in a clear, concise and logical manner.
D15. use internet and other electronic sources as a source of information.

3. Contents

Analysis and design of research studies (two hours/week)

Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.

Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.
Lectures 27-28	Design of experiments: The null hypothesis, statistical significance and rejecting the null hypothesis.
Lectures 29-30	Revision
Weeks 31, 32	**Assessment**

4. Teaching and Learning Methods

- Lectures are an integral part of course delivery in this course, supported by problems classes, tutorial groups, computational work, office hours, and individual tutorials.
- Students engage in private study in which they work through set problem sheets and individual assignments as well as assimilating lecture content.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 32th Week	90%
Oral Assessment	KU, I	Assessment Session	Term Final	5%
Semester work	KU, I	Continuous Assessment		5%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential books

- Glantz, Stanton A. (2005): Primer of Biostatistics, 6th Edition McGraw-Hill.

Recommended books

- Samuels, M. L. (1989): Statistics for the Life Sciences. Dellen Publishing Company, USA.

- Rosner, B. (1990): Fundamentals of Biostatistics. PWS-Kent Publishing Company, USA.

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computers Presentations and Writing Boards
- Primer or GraphPad biostatistics software.

	Course Coordinator	**Head of Department**
Name	Prof. Abd-Elmoneim A. Mohamed	Prof. **. Qadry Zakaria**
Name (Arabic)	**أ. د. عبد المنعم محمد طعيمه**	**أ. د. قدرى زكريا**
Signature	……………………………	…………………………..
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs													
	KU				I				P			T		
	A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	C 1	C 2	C 3	D 1	D 2	D 3
Introduction:	√	√	√	√										
Summarizing data.	√	√	√	√										
Sampling variability of a mean.	√	√	√	√										
Analysis of quantitative data	√	√	√	√										
ANOVA	√	√	√	√	√	√	√	√						
Examination	√	√	√	√										
Sampling variability of proportions	√	√	√	√										
Analysis of categorical data	√	√	√	√		√								
Regression and correlation.	√	√	√	√										
Comparing correlations	√	√	√	√										
Regression and correlation: Computer applications .	√	√	√	√					√	√	√	√	√	√

Comparing distribution : Computer applications	√	√	√	√					√	√	√	√	√	√
Comparing means: Computer applications	√	√	√	√					√	√	√	√	√	√
Comparing variances: Computer application	√	√	√	√					√	√	√	√	√	√

Course Title	**Computer**	
Course Code	1647	
Academic Year	**2014/2015**	
Coordinator	**Prof. Mohamed El-Awady**	
Other Staff	**Prof. Mahmoud Kamel, Prof. Ahmed El-Shishtawy, Prof. Qadry Zakaria**	
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc.**	
Course Delivery	**Lecture**	**28 x 1h lectures**
	Practical	**28 x 1h practicals**
Parent Department	**Computer Centre**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to acquire a range of transferable skills that are important for post graduate M. Sc. students to:

- Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.
- Underpin academic work throughout postgraduate studies.
- Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

A. Knowledge and understanding:

Upon successful completion of this course the students should be able to:

A1. Mention the use of IT in the context of the postgraduate studies.
A2. Define the diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.
A3. Describe different photo enhancing and manipulation techniques.

B. Intellectual skills:

They should also acquire the ability to:

B3. Integrate different application programs to develop effective information analysis and presentation.

B4. Solve scientific problems using computer programming.

C. Professional and practical skills:

C1. Use a number of computer packages to present information.
C2. Prepare presentation using sophisticated software packages.
C3. Make use of different internet resources.
C4. Carry out necessary graphical, statistical and frequency analyses of different types of data

D. General and transferable skills:

D3. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Lectures 1-2	Methods for graphical representations, Data analysis and Data modeling
	Assignment 1 : **Using Application programs**
	Calculation of Slope and intersection of lines ,
	Best fitting for data,
	Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)
Lectures 3-5	Statistical Data analysis
	Assignment 2 : **Using Application programs**
	Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data
Lecture 6-7	Creating powerful presentation including charts, images, video, etc and different attractive animations
	Assignment 3 : **Using PowerPoint program**
	Design a real and powerful presentation with different acquired skills
Lecture 8-9	Use of internet capabilities and searching engines

Assignment 4: Using the Internet

Life search on the internet for some real information

Lecture 10-11 Creating Data Base and related Queries and Reports

Assignment 5: Using Application programs

Creating a real Data Base and apply different queries and reports to extract useful information

Lecture 12-13 Computer programming language

Assignment 6: Programming using Visual Basic 6

Solving real problems using a computer language

Lecture 14-15 Photo manipulation and enhancement using the photoshop

Assignment 7: **Using the Photoshop program**

Practicing on manipulation and enhancing of images

Lectures 16 Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Assignments

The course is delivered through lectures, practical sessions and assignments. Team working skills are developed on a week-long laboratory exercises and the students present and defend their findings in a public seminar.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous		10%

		Assessment		

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

	Course Coordinator	Head of Department
Name	Prof. Mohamed M. El-Awady	Prof. Elsayed Taha Rizq
Name (Arabic)	أ.د.محمد العوضي	أ.د. السيد طه رزق
Signature		
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs									
	KU							I	P	T
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Methods for graphical representations, Data analysis and Data modeling										
Assignment 1 : Using Application programs	√	√	√	√	√	√	√			
Statistical Data analysis	√	√	√	√	√	√	√	√		
Assignment 2 : Using Application programs	√	√	√	√	√	√	√	√		
Creating powerful presentation	√	√	√	√	√	√	√			
Assignment 3 : **Using PowerPoint program**	√	√	√	√	√	√	√		√	
Use of internet capabilities and searching engines	√	√	√	√	√	√	√			√
Assignment 4: Using the Internet	√	√	√	√	√	√	√			√
Creating Data Base and related Queries and Reports	√	√	√	√	√	√	√			
Assignment 5: Using Application programs	√	√	√	√	√	√	√			
Computer programming language	√	√	√	√	√	√	√			
Assignment 6: Programming using Visual Basic 6	√	√	√	√	√	√	√			
Photo manipulation and enhancement using the photoshop	√	√	√	√	√	√	√			
Assignment 7: **Using the Photoshop program**	√	√	√	√	√	√	√			

M.Sc. Programme
of
Comparative Anatomy
of Vertebrates

Academic Reference Standards for M.Sc. degree in Comparative Anatomy of Vertebrates

1. Academic Standards:

The Academic Reference Standards (ARS) for the award of the M.Sc. degree in Comparative Anatomy of Vertebrates are designed to provide students with the knowledge and skills for proficiency in Zoological Science. The National Authority for Quality Assurance and Accreditation of Education (NAQAAE) for M.Sc. degree is used as the core of this academic standards to determine appropriate content and process skills for students. The relationship between science, our environment, and our everyday world is crucial to each student's success and should be emphasized. Science consists of a way of thinking and investigating, and includes a growing body of knowledge about the natural world. To become literate in science, therefore, students need to acquire understandings of both the Characteristics of Science and its Content.

The following Specific ARS for the M.Sc. in Zoology were approved by the Council of the Faculty of Science, Tanta University.

1.1. Graduate Attributes:

Graduate of M.Sc. Program in Comparative Anatomy of Vertebrates Should be Able to:

- 1.1.1-Apply the knowledge of Zoological Science and their related disciplines, applications and tools in solving scientific problems.
- 1.1.2-Apply the analytical methods in Zoology research.
- 1.1.3-Apply specialized knowledge in Zoology combined with related knowledge in professional practice.
- 1.1.4- Show awareness of the ongoing problems in the minor specialization.
- 1.1.5- Use appropriate technological resources to serve and improve the professional practice.
- 1.1.6- Communicate effectively and lead teams.
- 1.1.7- Show awareness of his/her role in community development and preservation of the environment in light of global and local changes.
- 1.1.8- Share in multidisciplinary team work and be flexible for adaptation and working under contradictory conditions.
- 1.1.9- Hold professional values that maintain individuality, positive thinking and self-confidence.
- 1.1.10- Collect, summarize and present data, undertake professional and ethical responsibilities.

1.2. Knowledge and Understanding:

Students analyze how scientific knowledge is developed and will understand important features of the process of scientific inquiry. By the end of the program, the M.Sc. holder must have precise knowledge in different areas and research fields in zoology and be able to:

- 1.2.1- Investigate the advanced knowledge and training in one or more areas of Zoology with more specific subject-related skills in one of these areas.

1.2.2- Explain the theoretical and practical knowledge of various Zoological aspects, their knowledge which are required for professional activities in the field of Zoology research career.

1.2.3- Demonstrate a comprehensive understanding of essential literature in their specific research area.

1.2.4- Define the scientific progress in the area of his/her minor specialty.

1.2.5-Write on the routine applied for interpreting and analyzing Zoological information.

1.2. 6- Illustrate the principles of ethics in scientific studies and research.

1.3. Intellectual Skills

Students will apply the following to inquiry intellectual practices:

1.3.1- Criticize approach to any Zoological and environmental problems which they may encounter.

1.3.2- Postulate and deduce mechanisms and procedures to handle scientific problems.

1.3.3-Perform perfectly the modern professional practice in the minor specialty of Zoology.

1.3.4- Apply a significant information gathering and analytical skills in an area of applied research in Zoology.

1.3.5- Develop lines of argument and appropriate judgments in accordance with the scientific theories and concepts.

1.3.6- Create plan to develop performance in the minor area of specialty.

1.3.7- Apply appropriate physical principles to create and analyze system components

1.3.8- Evaluate the risks in professional practices in the minor area of specialty.

1.3.9-Analyze and estimate knowledge in the area of minor specialty and use it in solving research problem.

1.3.10- Reconstruct the available resources effectively and develop them.

1.3.11- Differentiate between subject-related theories and assess their concepts and principles.

1.3.12- Analyze, synthesize, assess and interpret qualitatively and quantitatively science relevant data.

1.3.13- Construct several related integrated information to confirm, make evidence and test hypothesis.

1.3.14- Use theories of zoology to interpret results.

1.4. Professional and practical skills:

Students will be encountered important features of the process of scientific inquiry and by the end of the program, the M.Sc. holder must be able to:

1.4.1- Perform the skills of analytical biological information in selecting the appropriate biological instrumentations and laboratory techniques in various fields of Zoology.

1.4.2- Plane, design, conduct and report on the investigated data, using appropriate techniques and considering scientific guidance.

1.4.3- Store sufficient idea for methods of collection, classification, preservation and analysis of animal samples.

1.4.4- Apply techniques and tools considering scientific ethics.

1.4.5- Perform research in Zoological sciences and demonstrate proficiency in the techniques and methods appropriate for their research area in minor specialty.

1.4.6-Design and conduct a research project and be able to present the results to an appropriate forum both in oral and in written format.

1.4.7- Proficiently teach the laboratory sections in Zoology as well as one specialty area and able to compete positively for jobs in academic and private area.

1.4.8- Collect evidences to test and confirm the scientific hypothesis in the field of minor specialty.

1.4.9- Implant comprehensive physical knowledge and understanding as well as intellectual skills in research tasks.

1.4.10- Use the national standards for laboratory equipment which are essential for practical work.

1.5. General and Transferable Skills.

By the end of the program, the M.Sc. holder must be able to:

1.5.1- Oral and written communicate and exchange the information effectively through seminars and discussion meetings.

1.5.2- Effectively use information and communication technology and identify roles and responsibilities, and their performing manner.

1.5.3- Think independently, set tasks and solve problems on scientific basis.

1.5.4- Work in group effectively, manage time and communicate with others positively.

1.5.1- Consider community linked problems, ethics and traditions and acquire self- and long life–learning.

1.5.5- Deal with scientific data in Arabic, English or other languages.

1.5.6- Apply effectively scientific models, systems, , information technology, and tools and deal with scientific patents, also, exhibit the sense of beauty and neatness.

1.5.7- Fit the ethics of scientific research.

2- Curriculum Structure and Contents:

٢.1- Program duration: At least two years for the thesis preparation.

٢.2- Program Structure: Thesis in different branches of zoology.

Thesis

The thesis of M.Sc. program in Zoology is a formal written document representing sustained research into an important intellectual issue. The thesis must be an independent effort which contributes to the accumulated understanding of the field in which it is written. The required research preparation and advanced research methods courses will help the student to focus his or her research effort, and provide general guidelines for research approach and report preparation. Thesis will be reviewed and approved by the candidate's supervising professor and external academic review committee.

a. The thesis should contain the following:

- Title page (title, name of student, university, faculty, name of program, date, supervisors
- Table of contents
- Introduction, containing a definition of the thesis statement, working method, the theoretical framework, and the aim.
- Literature review.

- Materials and methods.
- Results
- Discussion and conclusions
- References.

b. Language of the thesis:

The thesis must be written in English language accompanied by a summary in Arabic.

c. Formation of Examiners Committees

A committee is selected by zoology Department Council. The M.Sc. Degree is awarded to the applicant by University, upon the recommendation of the department and the Faculty Council.

3-Program Admission Requirements:

An applicant for admission to the M.Sc. program in zoology should hold an B.Sc. degree in zoology with a minimum grade of (Good = 70%)

4- Program Student Evaluation

- Courses of pre-master academic year
- At least one published paper
- Written thesis
- Public hearing
- Defense exam

A. Program Specification

Program Title	**MSc-Comparative Anatomy of Vertebrates**
Award	**Master of Comparative Anatomy of Vertebrates**
Parent Department	**Zoology Department**
Teaching Institution	**Faculty of Science - TU**
Awarding Institution	**Tanta University**
Coordinator	**Prof.** Nabil El Fiky
External Evaluator(s)	**Applied**
QAA Benchmarking Standards	**Academic Reference Standards (ARS)**
Other Reference Points	**Bioscience, Egyptian Code of Assessment**
Date of Delivery	**Every year in September**
Review Date	**Internal Periodic Review, Summer 2014**
Date of Approval	**September, 2014**

1. Aims

- To develop the knowledge of population change as brought about by mechanism of organic evolution, the major phylogenetic and comparative aspects of anatomy, physiology, reproduction and embryology of vertebrate phyla of the animal
- To familiarize with the basic systematic methodologies and able to readily identify many common species of Egypt.
- To develop a critical analysis on the phylogenetic relationship among major vertebrate groups incorporating both traditional morphologically based hypothesis as well as recent molecular hypothesis.
- To provide arrange of practical skills, ecological and systematic methods, research techniques and advanced knowledge appropriate to employment in a wide range of contexts.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should acquire the ability to:

A1. describe the evolutionary processes responsible for biological diversity, explain the phylogenetic relationships among the major taxa of life and provide illustrative examples to provide a foundation for further studies in biology .

A2. describe the anatomical basis for nutrition, osmoregulation, excretion, digestion, reproduction, development, locomotion and sensory interactions with the environment in a phylogenetic context.

A3. describe the process of gamete production, fertilization, cleavage, formation of germ layers and the mechanisms of embryo development of vertebrate groups.

B. Intellectual skills:

They will also acquire the ability to:

B1. formulate a hypothesis, plan and execute laboratory investigation or development work, evaluate the outcomes and draw valid conclusions.

B2. plan and write original essay evaluating published research articles and addressing issues of importance selected from various topics covered by the degree.

B3. analyse, synthesise and assimilate diverse information in a critical manner.

B4. construct reasoned arguments to support a position on the ethical and social impact of scientific advances and appreciate the existence of different points of view.

C. Professional and practical skills:

C1. identify and describe the differences between individual within different vertebrate taxa.

C2. apply basic knowledge and techniques of experimental embryology on the laboratory models, the toad and chicken .

C3. write a scientific report and analysing data concerning the variations among examined vertebrates.

D. General and transferable skills:

D1. Apply numerical and IT skills with confidence and accuracy.

D2. Take responsibility for self-managed learning and personal/professional development.

D3. Able to work with a strong sense of direction and creativity.

D4. Communicate effectively and professionally by written and graphical form.

D5. Collect, record, analyse and interrpt data from a range of sources.

3. Academic standards

3.A External references for standards (Benchmarks):

Academic reference standards(ARS)

4. Curriculum Structure and contents:

4.A	Programme durationr: one year					
4.B	Programme structure					
4.B.1	Number of contact hours		per Week:			
			Lectures	6	Lab.	6
	Overall	Contact hours	Lectures	10	Lab.	9
4.B.2	Number of contact hours		Compulsory	6	Optional	6
4.B.3	Thesis					

5. Programme courses

Year 1	Course Title	Lec.	Prac.	Program ILOs Covered
Three of the first five courses are obligatory:				
1	Histology			
2	Comparative Anatomy of vertebrates	2	2	KU, I, P,T
3	vertebrate Embryology	2	2	KU, I, P,T
4	Vertebrate Evolution	2	2	KU, I, P,T
5	Biostatistics	1	-	KU, I,P, T
6	Computer	1	1	KU, I,P, T

6. Programme admission requirements

Arrangements for admission are based on the national guidelines with no Faculty control on the number of newly enrolled students.

Candidates must satisfy the general admission requirements of the University, Faculty in Biology and also hold one of the following:

The applicants must have obtained a Bachelor’s degree, or its equivalent, in Zoology with a “good” degree as a minimum for approval.

7. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression:

- The programme includes one year of coursework, followed by a research project, i.e. the Master thesis, by laboratory investigation in a mentored environment.

- Assessment is held by the end of the first year, and student will be eligible only on attaining a "pass" degree (60%).

- The student who fails certain course at the first attempt will be eligible for only a "Pass" degree following only one re-set examination.

- The student can submit his thesis only after one year from the date of the Faculty Council approval on the thesis subject.

8. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Not applied yet	
2. Alumni	Not applied yet	
3. Stakeholders(Employers)	Not applied yet	
4. External Evaluator(s)(External Examiner(s))	applied	
5. student questionnaire	applied	A questionnaire applied on courses individually

We certify that all of the information required to deliver this programme is contained in the above specification and will be implemented. All course specifications for this program are in place

Name	Signature	Date
Programme Coordinator: Prof. Nabil Kamal Elfiky **(أ. د. نبيل كمال الفقى)**	……..……..………..………	/9/2014
Head of Quality Assurance Unit: Prof. Hoda Salem **(أ. د. هدى سالم)**	……..……..………..………	/9/2014
Dean of the Faculty: Prof. Tarek Fayed **(أ. د. طارق فايد)**	……..……..………..………	/9/2014

M.Sc. Courses: Programme Matrix

Programme Title: Master of Science (M.Sc.) degree in Expermintal Zoology

Programm intended learning outcomes ILOs	Academic standards intended learning outcomes ILOs																				
	KU						I							P		T					
	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	B7	C1	C2	D1	D2	D3	D4	D5
A1. describe the evolutionary processes responsible for biological diversity	√																			
A2. describe the anatomical basis for nutrition																				
A3. describe the process of gamete production																				
B1. formulate a hypothesis							√													
B2. plan and write original essay evaluating published research articles																√				
B3. analyse, synthesise and assimilate diverse information in a critical manner.							√													
B4. construct reasoned arguments to support a position on the ethical											√									
C1. identify and describe the differences between individual within different vertebrate								√												

taxa.																				
C2. apply basic knowledge and techniques of experimental embryology on the laboratory models, the toad and chicken .															√					
C3. write a scientific report and analysing data concerning the variations among examined vertebrates.															√					
D1. apply numerical and IT skills with confidence and accuracy.																	√			
D2. take responsibility for self-managed learning and personal/professional development.																	√			
D3. the capacity to work with a strong sense of direction and creativity.																				
D4. communicate effectively and professionally by written and graphical form.																	√			
D5. collect, record, analyse and interpret data from a range of sources.																		√		

Course - Programme ILOs Matrix (Curriculum Map)

Course title	Intended learning outcomes ILOs														
	KU			I				P			T				
	A 1	A 2	A 3	B 1	B 2	B 3	B 4	C 1	C 2	C 3	D 1	D 2	D 3	D 4	D 5
Histology						√	√								
Comparative Anatomy of vertebrate		√				√	√								
vertebrate Embryology						√	√		√						
Vertebrate Evolution	√		√			√	√	√							
Biostatistics				√		√	√			√					√
Computer					√					√	√				
thesis				√	√	√	√	√	√	√	√	√	√	√	√

Course Title	**Histology**	
Course Code		
Academic Year	**2014/2015**	
Coordinator	**Prof. Ahlam A. Abou Shafey**	
Other Staff		
Level	Graduate-MSc	
Semester	One acdemic year	
Pre-Requisite		
Course Delivery	**Lecture**	28 x 2h lectures
	Practical	28 x 2h practicals
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

This module is in two halves:

• Provide students with adequate theoretical knowledge and professional skills in systemic animal tissues.

• Illustrate the advanced techniques in studying tissues.

• Create the ability to read and comment on electron microcopy observation.

• Acquire the ability to continuing research enhancement in the field of histology.

2. Intended Learning outcomes

A. Knowledge and understanding:

Upon successful completion of this course the student should be able to:

A4. Describe the normal histological features(lm) and ultra-structure(tem) of various body systems (digestive, endocrine respiratory, urinary, circulatory.

A5. describe and distinguish structural features of histological organs, regions and cell types present in each system and relate the structural variations to differences in organ function.
A6. explain the physiological, ultrastructural and specialized function of different cell types in different organ of the body

B. Intellectual skills:

They will also acquire the ability to

B2. correlate between histological structure, ultra-structure and function of different tissues and organs of all studied mammalian systems.

C. Professional and practical skills:

C4. analyse, summarise and integrate information critically from a variety of media.
C5. recognize & distinguich between different organs in histological slides seen under the microscope.

C6. correlate the organs in each system with their function.

D. General and transferable skills:

D4. use the internet and other electronic sources as a source of information.

D5. develop team work skills and conduct lab investigation in a safe and ethical manner.

D6. communicate effectively with the colleagues as well as the employes and staff members.

3. Contents

Part – 2	**Histology**
Lectures 1,2	Circulatory system (blood vascular and lymphatic systems). Blood vascular system, histological structure of heart wall, and general structure of blood vessel wall.
Lectures 3,4	Arteries and veins; (large, medium-sized and small), blood capillaries, sinusoids and a-v anastomosis.
Lectures 5,6	Endocrine system, introduction, distribution of endocrine glands, 1) pituitary gland: a- adenohypophysis, histological structure and explain cell types of sth, lth, tsh, gth, acth and msh cells, sites and function.
Lectures 7,8	B- neurohypophysis of pituitary gland (pars nervosa), types of its nerve fibres and cells. 2) thyroid gland (lm&tem): follicular cells, parafollicular cells and interfollicular cells, and 3)

	parathyroid gland (chief and oxyphil cells), sites and functions.
Lectures 9,10	4) Adrenal glands (lm & tem):a- adrenal cortex (zona glomerulosa, zona fasciculata and zona reticularis). B- adrenal medulla (types of chromaffin cells:adrenaline and nor adrenaline cells.
Lectures 11,12	Integument; skin and appendages. Types, sites and structure of skin, hairs, hair follicles and nails.
Lectures 13,14	Color of skin, skin glands; sweat and sebaceous glands.
Lectures 15,16	Digestive system, oral cavity; lip, tongue, palate and pharynx.
Lectures 17,18	Alimentary tract; esophagus, stomach, small and large intestine.
Lectures 19,20	Digestive glands; salivary glands, liver and pancreas.
Lectures 21,22	Urinary system(lm & tem); kidney, nephron, collecting tubules, and blood–renal barrier.
Lectures 23,24	Juxta-glomerular apparatus, ureter, urinary bladders and urethra.
Lectures 25,26	Respiratory system:1)conducting portion: nasal cavity (naso-pharynx and larynx), trachea and respiratory epithelium.
Lectures 27,28	Lung, lm & tem (bronchi & terminal bronchiols), 2)respiratory portion (respiratory bronchioles, alveolar duct & sacs, alveoli, pneumocytes (type i & ii), alveolar macrophages and blood-air barrier.
Weeks 29,30 Weeks 31,32	**Assessment**

4. Teaching and Learning Methods

- Lectures.
- Practical Classes.

5. Student Assessment

Assessment Method	**Skills assessed***	**Assessment Length**	**Schedule**	**Proportion**
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Course notes and Laboratory manual authorized by the Council of Department of Zoology.

Essential Books:

7. Facilities required for teaching and learning

- Projectors; Video and Overhead Projectors.
- Computer Presentations and Writing Boards.
- Microscopes; Compound and Stereoscopic.
- Museum Models.
- Scientific films and CDs.
- Library.

	Course Coordinator	Head of Department
Name	Prof. Ahlam A. Abou Shafey	Prof. Nabil Kamal El Fiky
Name (Arabic)	أ. د. أحلام السيد أبو شافعى	أ. د. نبيل كمال الفقى
Signature	………………………….	……………………………….
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs									
	KU			I	P			T		
	A1	A2	A3	B1	C1	C2	C3	D1	D2	D3
Circulatory system (blood vascular and lymphatic systems)	√	√	√							
Arteries and veins	√	√	√							
Endocrine system, introduction	√	√	√							
B- neurohypophysis of pituitary gland (pars nervosa)	√	√	√							
4) Adrenal glands (lm & tem	√	√	√							
Integument	√	√	√							
Color of skin, skin glands	√	√	√							
Digestive system, oral cavity	√	√	√							
Alimentary tract; esophagus, stomach, small and large intestine.	√	√	√							
Digestive glands; salivary glands, liver and pancreas.	√	√	√	√						
Urinary system(lm & tem)	√	√	√	√						
Juxta-glomerular apparatus, ureter, urinary bladders and urethra.	√	√	√	√						
Respiratory system:1)conducting portion: nasal cavity (naso-pharynx and larynx), trachea and respiratory epithelium.	√	√	√	√						
Lung, lm & tem (bronchi & terminal bronchiols), 2)respiratory portion (respiratory bronchioles, alveolar duct & sacs, alveoli, pneumocytes (type i & ii),	√	√	√	√						

alveolar macrophages and blood-air barrier.										
Practical part					√	√	√	√	√	√

Course Title	**Comparative Anatomy of vertebrates**	
Course Code		
Academic Year	**2014/2015**	
Coordinator	**Prof. Seham Salem**	
Other Staff	**Prof. Fouad Afifi, , Prof. Abeer Alm El Dean**	
Semester	One acdemic year	
Level	Graduate-MSc	
Pre-Requisite	Lectures	28 x 2h lectures
Course Delivery	practicals	28 x 2h practicals
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

The course is constructed to develop understanding of the comparative structure and function of the major organ systems in the vertebrate classes, with a focus on the integumentary, digestive, circulatory and skeletal vertebrate systems and special senses and the endocrine systems. This focus will provide a contemporary comparative approach to resolve the structural and functional basis of vertebrate behaviour and demonstrate how vertebrates recognize and initiate response to challenges set by their natural environments.

2. Intended Learning outcomes

A. Knowledge and understanding:

On successful completion of this module students should be able to:

- A1. show the significance of the structure and function of the main organ systems in different vertebrate classes and demonstrate an understanding of the major evolutionary changes that have occurred in these systems
- A2. identify the structural-functional basis of vertebrate behaviour and explain how vertebrates recognize and initiate response to challenges set by their environments

B. Intellectual skills:

- B1. analyse the structure of the vertebrate body in relation to function in comparative way and at the micro- and macro-levels.
- B2. analyse vertebrate body structure in an evolutionary approach.

C. Professional and practical skills:

C1. tackle basic skills of vertebrate dissection and some basic histological procedures.

C2. prepare vertebrate skeleton of representative vertebrates.

D. General and transferable skills:

D1. use IT in self-learning

3. Contents

Lecture – 1,2	**Integumemtary System**: Introduction: Terminology, Deravitives of the germ layers, classification of chordate.
Lecture – 3,4	Integumantry system: Skin in chordate classes, protochordates, fishes, reptilia, birds, mammals, glands in the mammalian skin.
Lecture – 4,5	Exoskeleton of cyclostomes, fishes placoid scales, cosmoid, ganoid, cycloid, cetenoid scales, development of cycloid scales, exoskeleton of the fins.
Lecture – 5,6	Exoskeleton of Amphibia, Reptilia: Development of horny scales. Exoskeleton of birds: types of feathers, development of feathers.
Lecture – 7,8	Exoskeleton of mammals: hairs, structure and development of hairs, teeth, structure and development of tooth, replacement and types of teeth among vertebrates.
Lecture – 9,10	**Skeletal system**: Comparative anatomy of skull: cyclostomes, gnathostomes, elasmobranch, development of chondrocranium, development of splanchnocranium. Skull of teleost fishes, primitive tetrapod skull.
Lecture – 11,12	Replacing bones in the cranium, replacing bones in the sense capsules, replacing bones in the gill arches.
Lecture – 13,14	Dermal bones in the Tetrapod skull: Dermatocranium, skull of primitive, modern amphibians.
Lecture – 15,16	Skull of reptilia, skull of birds.
Lecture – 17,18	Mammalian skull, vertebral column in chordata.
Lecture – 19,20	Development of vertebra, vertebra in different classes.
Lecture – 21, 22	Circulatory system: Arterial system, venous system.

Lecture – 23, 24	Excretory system and genital ducts.
Lecture – 25,26	The nervous system: Comparative anatomy of the brain. The digestive tract: an overview.
Lectures 27,28	Revision and discussion
Assessment	
Practical part	**Has the same topics related to the above subjects**

4. Teaching and Learning Methods

- Lectures
- Practical classes

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

Course notes and Laboratory manual authorized by the Council of Department of Zoology.

Essential Books:

George C. Kent and Robert K. Carr (2001): Comparative Anatomy of the Vertebrates, 9th Ed. McGraw Hill, Biological Science Series.

Linzey, S. (2001): Vertebrate Biology, McGraw-Hill, ISBN 0-697-36387-2

Recommended Books:

Pough, F.H., Janis, C.M & Heiser, J.B. (2001) *Vertebrate life.* 6th edition. London: Prentice-Hall International.

Walker W.F & Liem K. F (1994) *Functional anatomy of the vertebrates : an evolutionary perspective* 2nd edition. London: Saunders College Publishing.

Kardong KV (2002) *Vertebrates - Comparative Anatomy, Function , Evolution* 3rd edition. London, Mc Graw Hill

Web sites:

7. Facilities required for teaching and learning

- Projectors: Video.
- Computer Presentations and Writing Boards
- Microscopes; Compound and Stereoscopic.
- Microscopic Histological Preparations.
- Preserved Representative Models.
- Live Vertebrate Specimens.
- Museum, Library
-

	Course Coordinator	**Head of Department**
Name	**Prof. Fouad Afifi**	Prof. Nabil Kamal El Fiky
Name (Arabic)	**(أ. د. فؤاد عفيفى)**	**أ. د. نبيل كمال الفقى**
Signature	………………………..	………………………..
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs						
	KU		I		P		T
	A1	A2	B1	B2	C1	C2	D1
Integumemtary System	√	√	√	√			
Integumantry system: Skin in chordate classes, protochordates	√	√	√	√			
Exoskeleton of cyclostomes	√	√	√	√			
Exoskeleton of Amphibia	√	√	√	√			
Exoskeleton of mammals	√	√	√	√			
Skeletal system	√	√	√	√			
Replacing bones in the cranium, replacing bones in the sense capsules	√	√	√	√			
Dermal bones in the Tetrapod skull	√	√	√	√			
Skull of reptilia, skull of birds.	√	√	√	√			
Mammalian skull, vertebral column in chordata.	√	√	√	√			
Development of vertebra, vertebra in different classes.	√	√	√	√			
Circulatory system: Arterial system, venous system.	√	√	√	√			
Excretory system and genital ducts.	√	√	√	√			
The nervous system: Comparative anatomy of the brain. The digestive tract: an overview.	√	√	√	√			
Revision and discussion	√	√	√	√			
Practical part					√	√	√

Course Title	**Vertebrate Embryology**	
Course Code	--------	
Academic Year	**2014/2015**	
Coordinator	**Prof. Nabil El Fiky**	
Other Staff		
Level	**Master's Degree (Experimental Zoology)**	
Semester	**One continuous academic year**	
Pre-Requisite		
Course Delivery	**Lecture**	**28 2h lectures**
	Practical	**28 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

This course provides students with the principles of embryology with emphasis on current experimental approaches utilized in research of normal and abnormal development of the mammalian embryo.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module, students should be able to:

A1. Describe the processes of early embryonic development.
A2. Show the current methodologies for conducting research in the field of embryology.

B. Intellectual skills:

They will also acquire the ability to:

B1. develop critical thinking skills and apply information presented in class to new scientific related problems.

C. Professional and practical skills:

C1. carry out exercises and demonstrations to emphasize topics covered.
C2. gain experience with embryos and techniques used to study them.

D. General and transferable skills:

D1. use of information technology in reviewing recent literature and in self-learning.

3. Contents

Lecture – 1,2	Molecular Biology Review; Cell Cycle.
Lecture – 3,4	Cell Cycle Paper Discussion; Sterile Technique and Intro to Moving Eggs/Embryos.

Lecture – 4,5	In Vivo Oocyte Maturation and Fertilization; In Vitro Maturation and Fertilization (IVM/IVF).
Lecture – 5,6	In Vitro Maturation/Fertilization Paper Discussion; Oocyte Collection and In Vitro Maturation.
Lecture – 7,8	In Vitro Culture of Embryos; IVP Paper Discussion.
Lecture – 9,10	Preimplantation Development; In Vitro Fertilization, Embryo culture, Grading and Freezing.
Lecture – 11,12	Artificial Reproductive Technologies; ART Paper Discussion.
Lecture – 13,14	Maternal Zygotic Transition; Embryo RNA Isolation and Reverse Transcription.
Lecture – 15,16	Epigenetics and Imprinting.
Lecture – 17,18	Epigenetics and Imprinting; Epigenetics Paper Discussion.
Lecture – 19,20	Gene detection by PCR; Sex Determination.
Lecture – 21, 22	Germ Cells and Gametogenesis; Gel Electrophoresis of PCR products/introduction to cloning DNA.
Lecture – 23, 24	Transgenesis; Pronuclear Microinjection.
Lecture – 25,26	Nuclear Transfer.
Lectures 27,28	Revision and discussion
Assessment	
Practical part	**Has related subjects to those shown above**

4. Teaching and Learning Methods

- Lectures.
- Practical classes.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 16th Week	60%
Mid term Assessment	KU, I, T	1 hour Examination	1st Term Final	10%
Practical Examination	P	2 Hour Examination	The 15th Week	30%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Handouts.

Essential Books:

- Developmental Biology. Scott F. Gilbert. Sixth Edition.
- The Developing Human: Clinically Oriented Embryology. Keith L. Moore. Fourth Edition.
- Handbook of In Vitro Fertilization. Alan O. Trounson and David K. Gardner. Second Edition.
- Clinical Embryology: A Color Atlas and Text. Murray Brookes and Anthony Zietman.
- An Atlas of Preimplantation Genetic Diagnosis. Yury Verlinsky and Anver Kuliev.
- A Laboratory Guide to the Mammalian Embryo. David K. Gardner, Michelle Lane, and Andrew J. Watson.

7. Facilities required for teaching and learning

- Projectors: video and overhead.
- Analytical balance; waterbaths; incubators.
- Traditional laboratory glassware and plasticware.
- Animal specimens; representative slides.
- Library.

	Course Coordinator	**Head of Department**
Name	Prof. Nabil Kamal El Fiky	Prof. Nabil Kamal El Fiky
Name (Arabic)	أ. د. نبيل كمال الفقى	أ. د. نبيل كمال الفقى
Signature	……………………….	…………………………….
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs					
	KU		I	P		
	A1	A2	B1	C1	C2	D1
Molecular Biology Review; Cell Cycle.	√	√				
Cell Cycle Paper Discussion; Sterile Technique and Intro to Moving Eggs/Embryos.	√	√				
In Vivo Oocyte Maturation and Fertilization; In Vitro Maturation and Fertilization (IVM/IVF).	√	√				
In Vitro Maturation/Fertilization Paper Discussion; Oocyte Collection and In Vitro Maturation.	√	√	√			
In Vitro Culture of Embryos; IVP Paper Discussion.	√	√	√			
Preimplantation Development; In Vitro Fertilization, Embryo culture, Grading and Freezing.	√	√				
Artificial Reproductive Technologies; ART Paper Discussion.	√	√				
Maternal Zygotic Transition; Embryo RNA Isolation and Reverse Transcription.	√	√				
Epigenetics and Imprinting.	√	√				
Epigenetics and Imprinting; Epigenetics Paper Discussion.	√	√	√			
Gene detection by PCR; Sex Determination.	√	√				
Germ Cells and Gametogenesis; Gel Electrophoresis of PCR products/introduction to cloning DNA.	√	√				
Transgenesis; Pronuclear Microinjection.	√	√				
Nuclear Transfer.	√	√				
Molecular Biology Review; Cell Cycle.	√	√				
Revision and discussion			√			
Practical part	√	√	√	√	√	√

Course Title	Vertebrate Evolution	
Course Code	--------	
Academic Year	**2014/2015**	
Coordinator	**Prof. Nabil Elfiky**	
Other Staff		
Level	**Master's Degree (Experimental Zoology)**	
Semester	**One academic year**	
Pre-Requisite		
Course Delivery	**Lecture**	**28 2h lectures**
	Practical	**28 2h practicals**
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

The primary objective of organic evolution course is to understand the origin of animal species and how animals are adapted to its environment. The course is of two parts, the first one is concerned with the outstanding on the different evidences of organic evolution as well as the theories of evolution in addition to patterns of adaptation met with in animal kind. The second part of course is concerned with the evolution and radiation of different vertebrate groups from their ancestors through family trees.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module, students should be able to:

A1. Describe the evidences which support theories of organic evolution.
A2. Show the mechanisms and patterns of adaptation met with in different animal species.
A3. Explain the radiation and evolution of animal species from their ancestors.
A4. Give account on the phylogenetic family trees of different vertebrate classes.
A5. Describe the evolutionary relationships that link animal species.

B. Intellectual skills:

They will also acquire the ability to:

B1. develop critical thinking skills and apply information presented in class to new scientific related problems.
B2. distinguish the evolutionary relationships that link animal species.

C. Professional and practical skills:

C3. carry out exercises and demonstrations to emphasize topics covered.

D. General and transferable skills:

D1. use of information technology in reviewing recent literature and in self-learning.

3. Contents

Lecture 1	Introduction to organic evolution and course specification.
Lecture 2	Evidence derived from comparative anatomy analogous homologous structure , vestigal organs.
Lecture 3	Evidence derived from the field of Embryology, Theory of recapitulation, Biogenetic law
Lecture 4	Evidence derived from the field of physiology, Evidence derived from the field of Taxonomy
Lecture 5	Evidence derived from Palaeontology, Types of rocks, different kinds of fossils, Geological time chart
Lecture 6	Evolution of horse
Lecture 7	Evidence derived from geographic distribution and factors regulating distribution – Zoogeographical realms
Lecture 8	Lamarkian theory of evolution . Darwin's theory of Natural selection and its fundamental principles
Lecture 9	Devries mutation theory , types of mution
Lecture 10	What is adaptation, Physiological and protective adaptations
Lecture 11	Structural adaptations, adaptation and evolution
Lecture 12	Animal association adaptation
Lecture 13	Regional differentiation of chordate animals homology concept
Lecture 1	Vertebrate pedigree, Hemi, uro and cephalochordate
Lecture 2	Invertebrate phylogeny, Echinoderm affinities
Lecture 3	Chordate phylogeny
Lecture 4	Geological record, vertebrate classification
Lecture 5	Evolution and radiation of jawless vertebrates (Ostracorderms, Cyclostomata)
Lecture 6	Evolution and radiation of elasmobranchiomorphs
Lecture 7	Evolution and radiation of Osteichthyes

Lecture 8	Evolution and radiation of Amphibian
Lecture 9	Evolution and radiation of archosaurs (archioreptiles)
Lecture 10	Evolution and radiation of ruling reptilies
Lecture 12	Evolution and radiation of Birds
Lecture 13	Evolution and radiation of Mammalia
Lecture 14	Evolution and radiation of Placentalia

4. Teaching and Learning Methods

- Lectures.
- Practical classes.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Handouts.

Essential Books:

7. Facilities required for teaching and learning

- Projectors: video and overhead.
- Analytical balance; water baths; incubators.
- Traditional laboratory glassware and plastic ware.
- Animal specimens; representative slides.
- Library.

	Course Coordinator	Head of Department
Name	Prof. Nabil Kamal El Fiky	Prof. Nabil Kamal El Fiky
Name (Arabic)	أ. د. نبيل كمال الفقى	أ. د. نبيل كمال الفقى
Signature	……………………………..	…………………………….
Date	/9/2014	/9/2014

Course Title	**Biostatistics**	
Course Code	**23094**	
Academic Year	**2014/2015**	
Coordinator	**Prof. Abd-Elmoneim Anwar Mohamed**	
Other staff		
Level	**Preparatory level for MSc**	
Semester	**Continuous academic year**	
Pre-Requisite	B. Sc. Zoology	
Course delivery	**Lecture**	**28 x 1h lectures**
	Practical	**-**
Parent Department	**Mathematics Department**	
Date of Approval	**September, 2014**	

1. Aims

This module aims to provide M. Sc. students in biology with basic concepts of study design and data analysis suitable for laboratory and field research, and to help students to develop the skills needed to apply statistical methods using related statistical software; e.g. Primer or GraphPad in scientific biological research. Emphasis will be on practical and applied skills using example of relevance to biology students.

2. Intended Learning outcomes

A. Knowledge and understanding:

By the end of this course the students should be able to*:*

A21. raise students' consciousness concerning basic statistical issues such as statistical measures for data description; statistical estimation; correlations and testing hypothesis.

A22. understand the basic principles of study design.

A23. describe the types of variables that are used in biological research.

A24. appreciate the role of sampling variation, how to quantify the variability, and its role in comparing groups or categories.

B. Intellectual skills*:*

B17. carry out confidently simple essential statistical methods in biological research and to interpret results.

B18. select appropriate statistical methods for analysis of simple data sets and apply them on a computer using bio-statistical software, GraphPad.

B19. summarise data using graphical and tabular data.

B20. interpret research findings and explain them in a clear, concise and logical manner.

C. Professional and practical skills

C13. select and apply appropriate basic statistical methods for analysis of data.

C14. use GraphPad package in data analysis.

C15. tackle skills in handling data on a computer and otherwise, and deriving and presenting quantitative results using appropriate tables, figures, and summaries.

D. Transferable skills

D16. write report including graphical material.

D17. present and discuss the finding from statistical analysis in a clear, concise and logical manner.

D18. use internet and other electronic sources as a source of information.

3. Contents

Analysis and design of research studies (two hours/week)

Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.
Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.
Lectures 27-28	Design of experiments: The null hypothesis, statistical significance and rejecting the null hypothesis.
Lectures 29-30	Revision
Weeks 31, 32	**Assessment**

4. Teaching and Learning Methods

- Lectures are an integral part of course delivery in this course, supported by problems classes, tutorial groups, computational work, office hours, and individual tutorials.

- Students engage in private study in which they work through set problem sheets and individual assignments as well as assimilating lecture content.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	The 16th Week	90%
Oral Assessment	KU, I	Assessment Session	Term Final	5%
Semester work	KU, I	Continuous Assessment		5%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential books

- Glantz, Stanton A. (2005): Primer of Biostatistics, 6th Edition McGraw-Hill.

Recommended books

- Samuels, M. L. (1989): Statistics for the Life Sciences. Dellen Publishing Company, USA.

- Rosner, B. (1990): Fundamentals of Biostatistics. PWS-Kent Publishing Company, USA.

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computers Presentations and Writing Boards
- Primer or GraphPad biostatistics software.

	Course Coordinator	Head of Department
Name	Prof. Abd-Elmoneim A. Mohamed	Prof. . **Qadry Zakaria**
Name (Arabic)	أ. د. عبد المنعم محمد طعيمه	أ. د. قدرى زكريا
Signature	……………………………..	……………………………
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs													
	KU				I				P			T		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3
Introduction	√	√	√	√										
Summarizing data.	√	√	√	√										
Sampling variability of a mean.	√	√	√	√										
Analysis of quantitative data	√	√	√	√										
ANOVA	√	√	√	√	√	√	√	√						
Examination.	√	√	√	√										
Sampling variability of proportions	√	√	√	√										
Analysis of categorical data	√	√	√	√		√								
Regression and correlation.	√	√	√	√										
Comparing correlations and regression.	√	√	√	√										
Regression and correlation	√	√	√	√					√	√	√	√	√	√
Comparing distribution	√	√	√	√					√	√	√	√	√	√
Comparing means	√	√	√	√					√	√	√	√	√	√
Comparing variances	√	√	√	√					√	√	√	√	√	√

Course Title	**Computer**	
Course Code	1617	
Academic Year	**2014/2015**	
Coordinator	**Prof. Mohamed El-Awady**	
Other Staff	**Prof. Mahmoud Kamel, Prof. Ahmed El-Shishtawy, Prof. Qadry Zakaria**	
Semester	**Continuous academic year**	
Pre-Requisite		
Course Delivery	**Lecture**	**16 x 1h lectures**
	Practical	**16 x 1h practicals**
Parent Department	**Computer Centre**	
Date of Approval	**September, 20١4**	

1. Aims

This course will enable students to acquire a range of transferable skills that are important for post graduate M. Sc. students to:

- Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.
- Underpin academic work throughout postgraduate studies.
- Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

A. Knowledge and understanding:

Upon successful completion of this course the students should be able to:

A8. Demonstrate knowledge and understanding of the use of IT in the context of their postgraduate studies.
A9. Know the diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.
A10. Carry out necessary graphical, statistical and frequency analyses of different types of data.
A11. Create powerful presentation using sophisticated software packages.
A12. Make use of different internet resources.
A13. Solve scientific problems using computer programming.
A14. Make use of different photo enhancing and manipulation techniques.

B. Intellectual skills:

They should also acquire the ability to:

B5. Integrate different application programs to develop effective information analysis and presentation.

C. Professional and practical skills:

C1. Use a number of computer packages to present information.

D. General and transferable skills:

D4. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Lectures 1-2	Methods for graphical representations, Data analysis and Data modeling **Assignment 1** : **Using Application programs** Calculation of Slope and intersection of lines , Best fitting for data, Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)
Lectures 3-5	Statistical Data analysis **Assignment 2** : **Using Application programs** Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data
Lecture 6-7	Creating powerful presentation including charts, images, video, etc and different attractive animations **Assignment 3** : **Using PowerPoint program** Design a real and powerful presentation with different acquired skills
Lecture 8-9	Use of internet capabilities and searching engines **Assignment 4: Using the Internet** Life search on the internet for some real information
Lecture 10-11	Creating Data Base and related Queries and Reports **Assignment 5: Using Application programs** Creating a real Data Base and apply different queries and reports to extract useful information
Lecture 12-13	Computer programming language **Assignment 6**: Programming using Visual Basic 6 Solving real problems using a computer language
Lecture 14-15	Photo manipulation and enhancement using the photoshop **Assignment 7**: **Using the Photoshop program** Practicing on manipulation and enhancing of images
Lectures 16	Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Assignments

The course is delivered through lectures, practical sessions and assignments. Team working skills are developed on a week-long laboratory exercises and the students present and defend their findings in a public seminar.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

Course Coordinator		Head of Department
Name	Prof. Mohamed M. El-Awady	Prof. Elsayed Taha Rezk
Name (Arabic)	أ.د.محمد العوضي	أ.د. السيد طه رزق
Signature		
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs									
	KU							I	P	T
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Methods for graphical representations, Data analysis and Data modeling										
Assignment 1 : Using Application programs	√	√	√	√	√	√	√			
Statistical Data analysis	√	√	√	√	√	√	√	√		
Assignment 2 : Using Application programs	√	√	√	√	√	√	√	√		
Creating powerful presentation	√	√	√	√	√	√	√			
Assignment 3 : Using PowerPoint program	√	√	√	√	√	√	√		√	
Use of internet capabilities and searching engines	√	√	√	√	√	√	√			√
Assignment 4: Using the Internet	√	√	√	√	√	√	√			√
Creating Data Base and related Queries and Reports	√	√	√	√	√	√	√			
Assignment 5: Using Application programs	√	√	√	√	√	√	√			
Computer programming language	√	√	√	√	√	√	√			
Assignment 6	√	√	√	√	√	√	√			
Photo manipulation and enhancement using the photoshop	√	√	√	√	√	√	√			
Assignment 7: Using the Photoshop program	√	√	√	√	√	√	√			

M. Sc. Programme
of
Insect Ecology

1. Academic Standards:

The Academic Reference Standards (ARS) for the award of the M.Sc. degree in Insect Ecology are designed to provide students with the knowledge and skills for proficiency in Zoological Science. The National Authority for Quality Assurance and Accreditation of Education (NAQAAE) for M.Sc. degree is used as the core of this academic standards to determine appropriate content and process skills for students. The relationship between science, our environment, and our everyday world is crucial to each student's success and should be emphasized. Science consists of a way of thinking and investigating, and includes a growing body of knowledge about the natural world. To become literate in science, therefore, students need to acquire understandings of both the Characteristics of Science and its Content.

The following Specific ARS for the M.Sc. in Zoology were approved by the Council of the Faculty of Science, Tanta University.

1.1. Graduate Attributes:

Graduate of M.Sc. Program in Insect Ecology Should be Able to:

- 1.1.1-Apply the knowledge of Zoological Science and their related disciplines, applications and tools in solving scientific problems.
- 1.1.2-Apply the analytical methods in Zoology research.
- 1.1.3-Apply specialized knowledge in Zoology combined with related knowledge in professional practice.
- 1.1.4- Show awareness of the ongoing problems in the minor specialization.
- 1.1.5- Use appropriate technological resources to serve and improve the professional practice.
- 1.1.6- Communicate effectively and lead teams.
- 1.1.7- Show awareness of his/her role in community development and preservation of the environment in light of global and local changes.
- 1.1.8- Share in multidisciplinary team work and be flexible for adaptation and working under contradictory conditions.
- 1.1.9- Hold professional values that maintain individuality, positive thinking and self-confidence.
- 1.1.10- Collect, summarize and present data, undertake professional and ethical responsibilities.

1.2. Knowledge and Understanding:

Students analyze how scientific knowledge is developed and will understand important features of the process of scientific inquiry. By the end of the program, the M.Sc. holder must have precise knowledge in different areas and research fields in zoology and be able to:

- 1.2.1- Investigate the advanced knowledge and training in one or more areas of Zoology with more specific subject-related skills in one of these areas.
- 1.2.2- Explain the theoretical and practical knowledge of various Zoological aspects, their knowledge which are required for professional activities in the field of Zoology research career.
- 1.2.3- Demonstrate a comprehensive understanding of essential literature in their specific research area.

1.2.4- Define the scientific progress in the area of his/her minor specialty.

1.2.5-Write on the routine applied for interpreting and analyzing Zoological information.

1.2. 6- Illustrate the principles of ethics in scientific studies and research.

1.3. Intellectual Skills

Students will apply the following to inquiry intellectual practices:

1.3.1- Criticize approach to any Zoological and environmental problems which they may encounter.

1.3.2- Postulate and deduce mechanisms and procedures to handle scientific problems.

1.3.3-Perform perfectly the modern professional practice in the minor specialty of Zoology.

1.3.4- Apply a significant information gathering and analytical skills in an area of applied research in Zoology.

1.3.5- Develop lines of argument and appropriate judgments in accordance with the scientific theories and concepts.

1.3.6- Create plan to develop performance in the minor area of specialty.

1.3.7- Apply appropriate physical principles to create and analyze system components

1.3.8- Evaluate the risks in professional practices in the minor area of specialty.

1.3.9-Analyze and estimate knowledge in the area of minor specialty and use it in solving research problem.

1.3.10- Reconstruct the available resources effectively and develop them.

1.3.11- Differentiate between subject-related theories and assess their concepts and principles.

1.3.12- Analyze, synthesize, assess and interpret qualitatively and quantitatively science relevant data.

1.3.13- Construct several related integrated information to confirm, make evidence and test hypothesis.

1.3.14- Use theories of zoology to interpret results.

1.4. Professional and practical skills:

Students will be encountered important features of the process of scientific inquiry and by the end of the program, the M.Sc. holder must be able to:

1.4.1- Perform the skills of analytical biological information in selecting the appropriate biological instrumentations and laboratory techniques in various fields of Zoology.

1.4.2- Plane, design, conduct and report on the investigated data, using appropriate techniques and considering scientific guidance.

1.4.3- Store sufficient idea for methods of collection, classification, preservation and analysis of animal samples.

1.4.4- Apply techniques and tools considering scientific ethics.

1.4.5- Perform research in Zoological sciences and demonstrate proficiency in the techniques and methods appropriate for their research area in minor specialty.

1.4.6-Design and conduct a research project and be able to present the results to an appropriate forum both in oral and in written format.

1.4.7- Proficiently teach the laboratory sections in Zoology as well as one specialty area and able to compete positively for jobs in academic and private area.

1.4.8- Collect evidences to test and confirm the scientific hypothesis in the field of minor specialty.

1.4.9- Implant comprehensive physical knowledge and understanding as well as intellectual skills in research tasks.

1.4.10- Use the national standards for laboratory equipment which are essential for practical work.

1.5. General and Transferable Skills.

By the end of the program, the M.Sc. holder must be able to:

1.5.1- Oral and written communicate and exchange the information effectively through seminars and discussion meetings.

1.5.2- Effectively use information and communication technology and identify roles and responsibilities, and their performing manner.

1.5.3- Think independently, set tasks and solve problems on scientific basis.

1.5.4- Work in group effectively, manage time and communicate with others positively.

1.5.1- Consider community linked problems, ethics and traditions and acquire self- and long life–learning.

1.5.5- Deal with scientific data in Arabic, English or other languages.

1.5.6- Apply effectively scientific models, systems, , information technology, and tools and deal with scientific patents, also, exhibit the sense of beauty and neatness.

1.5.7- Fit the ethics of scientific research.

2- Curriculum Structure and Contents:

٢.1- Program duration: At least two years for the thesis preparation.

٢.2- Program Structure: Thesis in different branches of zoology.

Thesis

The thesis of M.Sc. program in Zoology is a formal written document representing sustained research into an important intellectual issue. The thesis must be an independent effort which contributes to the accumulated understanding of the field in which it is written. The required research preparation and advanced research methods courses will help the student to focus his or her research effort, and provide general guidelines for research approach and report preparation. Thesis will be reviewed and approved by the candidate's supervising professor and external academic review committee.

a. The thesis should contain the following:

- Title page (title, name of student, university, faculty, name of program, date, supervisors
- Table of contents
- Introduction, containing a definition of the thesis statement, working method, the theoretical framework, and the aim.
- Literature review.
- Materials and methods.

- Results
- Discussion and conclusions
- References.

b. Language of the thesis:

The thesis must be written in English language accompanied by a summary in Arabic.

c. Formation of Examiners Committees

A committee is selected by zoology Department Council. The M.Sc. Degree is awarded to the applicant by University, upon the recommendation of the department and the Faculty Council.

5. Program Admission Requirements:

An applicant for admission to the M.Sc. program in zoology should hold an B.Sc. degree in zoology with a minimum grade of (Good = 70%)

4- Program Student Evaluation

- Courses of pre-master academic year
- At least one published paper
- Written thesis
- Public hearing
- Defense exam

A. Program Specification

Program Title	**Master of Insect Ecology**
Award	**Master of Insect Ecology**
Parent Department	**Zoology Department**
Teaching Institution	**Faculty of Science - TU**
Awarding Institution	**Tanta University**
Coordinator	**Prof. Amal Seif**
External Evaluator(s)	**applied**
QAA Benchmarking Standards	**Academic Reference Standards (ARS)**
Other Reference Points	**Bioscience, Egyptian Code of Assessment**
Date of delivery	**Every year in September**
Review Date	**Internal Periodic Review, Summer 2014**
Date of Approval	**September, 2014**

1. Aims

- To obtain broad, basic knowledge in the unique ecological roles of insects.
- To develop practical skills associated with ecological studies on insects and an understanding of how they can be used by the student for completion of original research, which should provide a significant contribution to knowledge.
- To enable students to acquire knowledge and understanding of insect pathogens and biotechnology, to show sources of information about biological control and those who practice it to teach the relevant aspects of lows that govern the practice of biological control.
- To enable the acquisition of a comprehensive range of transferable skills.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should be able to:

A1. Explain the major pest problems, their recognition and underlying causes.

A2. Describe the natural limitation of populations (abiotic and biotic); classical biological control.

A3. Enumerate the ecological and management principles of pest control.

A4. Explain assessing effects of biological control agents, partitioning mortality of pests.

B. Intellectual skills:

They will also acquire the ability to:

B32. Formulate a hypothesis, plan and execute laboratory investigation or development work, evaluate the manipulation of antimicrobial defense systems for pest control.

B33. Discuss the familiar and unfamiliar problems related to pest management.

B34. Analyse, synthesise and assimilate diverse information in a critical manner.

B35. Construct reasoned arguments to support a position on the ethical and social impact of scientific advances and appreciate the existence of different points of view.

B36. Formulate and test hypotheses using appropriate experimental design and statistical analysis of data.

C. Professional and practical skills:

C24. Use appropriate software package to analyze quantitative data about the susceptibility of insects to insecticides .

C25. undertake laboratory investigations in a responsible, safe and ethical manner.

D. General and transferable skills:

D36. Apply statistical and modeling skills.

D37. Apply numerical and IT skills with confidence and accuracy.

D38. Work both independently and in collaboration with others.

D39. Take responsibility for self-managed learning and personal/professional development.

3. Academic standards

3.A External references for standards (Benchmarks):

National academic reference standards (NARS).

4. Curriculum Structure and contents:

4.A	Programme duration: one year					
4.B	Programme structure					
4.B.1	Number of contact hours		per Week:			
			Lectures	6	Lab.	6
	Overall	Contact hours	Lectures	8	Lab.	7
4.B.2	Number of contact hours		Compulsory	6	Optional	6
4.B.3	Thesis					

5. Programme courses

Year 1	Course Title	Lec.	Prac.	Program ILOs Covered
Three of the first five courses are obligatory:				
1	Insecticides and pollution	2	2	KU, I, P,T
2	Insect Ecology and population dynamics	2	2	KU, I, P,T
3	Insect Biological control.	2	2	KU, I, P,T
4	Medical Entomology	2	2	KU, I, P,T
5	Biostatistics	1	-	KU, I, P,T
6	Computer	1	1	KU, I,P, T

6. Programme admission requirements

Candidates must satisfy the general admission requirements of the University and Faculty in Biology and also hold B. Sc. in Entomology or its equivalent, with a "good" degree as a minimum for approval.

7. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression:

- The programme includes one year of coursework, followed by laboratory investigation in a mentored environment.

- Assessment is held by the end of the first year, and student will be eligible only on attaining a "pass" degree (60%).

- The student who fails certain course at the first attempt will be eligible for only a "Pass" degree following only one re-set examination.

- The student can submit his thesis only after one year from the date of the Faculty Council approval on the thesis subject.

8. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Not applied yet	
2. Alumni	Not applied yet	
3. Stakeholders(Employers)	Not applied yet	
4. External Evaluator(s)(External Examiner(s))	applied	
5. student questionnaire	applied	A questionnaire applied on courses individually

We certify that all of the information required to deliver this programme is contained in the above specification and will be implemented. All course specifications for this program are in place

Name	Signature	Date
Programme Coordinator: Prof. Amal Seif (أ. د. آمال سيف)	…….……..…	/9/2014
Head of Quality Assurance Unit: Prof. Hoda Kamal Seif (أ. د. هدى كمال سالم)	…….……..…	/9/2014
Dean of the Faculty: Prof. Tarek Fayed. (أ. د. طارق فايد)	…….……..…	/9/2014

M.Sc. Courses: Programme Matrix

Programme Title: Master of Science (M.Sc.) degree in Physiology

Programm intended learning outcomes ILOs	Academic standards intended learning outcomes ILOs																				
	KU						I							P		T					
	A 1	A 2	A 3	A 4	A 5	A 6	B 1	B 2	B 3	B 4	B 5	B 6	B 7	C 1	C 2	D 1	D 2	D 3	D 4	D 5
A1. Explain the major pest problems	√																				
A2. Describe the natural limitation of populations																					
A3. Enumerate the ecological																					
A4. Explain assessing effects of biological control agents																					
B1. For mulate a hypothesis										√											
B2. Dis cuss the familiar and unfamiliar problems.																					
B3. An alyse, synthesise and assimilate diverse informatio								√													

n in a critical manner.																				
B4. Construct reasoned arguments to support a position on the ethical											√									
B5. Formulate and test hypotheses using appropriate experimental design															√					
C1. Use appropriate software package to analyze quantitative data																				
C2. Undertake laboratory investigations															√					
D1. Apply statistical and modeling skills.																	√			
D2. Apply numerical and IT skills with confidence and																	√			

accuracy.																				
D3. Work both independently and in collaboration with others.																	√			
D4. Take responsibility for self-managed learning																		√		

Course - Programme ILOs Matrix (Curriculum Map)

Course title	Intended learning outcomes ILOs														
	KU				I							P			
	A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	B 5	C 1	C 2	D 1	D 2	D 3	D 4
Insect Ecology and population dynamics		√						√			√				√
Insect Biological control.			√	√				√			√				√
Medical Entomology	√				√	√		√			√				√
Biostatistics							√	√	√	√		√			
Computer									√	√			√	√	
Thesis					√	√	√	√	√	√	√	√	√	√	√

B. Course Specification

Course Title	**Insecticides and pollution**	
Course Code	**14104**	
Academic Year	**2014/ 2015**	
Coordinator	**Prof. Amal I. Seif**	
Other Staff		
Semester	**First and second semesters**	
Level	**Graduate-MSc**	
Pre-Requisite	**B. Sc, and equivalent degrees**	
Course Delivery	**Lecture**	**2h lecture / week**
	Practical	**2h practices/week**
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

This module aims to enable students to

1- Acquire knowledge and critical understanding of the important properties of organic compounds used for the preparation of insecticides.

2- Know the development and types of resistance; mechanism of resistance: metabolism of insecticides; detoxification mechanism in insects, principles in the analysis of formulations and residue, fate of insecticides in soils.

3- Understand Insecticide control order-uses and limitations.

2. Intended Learning outcomes

A. Knowledge and understanding:

Upon successful completion of the student should be able to:

A1. Explain the major pest problems, their recognition and underlying causes

A2. Enumerate control methods, application and their effective integration.

A3. Describe the ecological and management principles of pest control.

A4. State the economic and environmental costs of control methods and their evaluation.

B. Intellectual skills:

They will also acquire the ability to:

B1. Analyze and solve pest management- based problems using an integrated multidisciplinary approach, applying professional judgments to balance costs, benefits, safety and social and environmental impact

B2. Formulate and test hypotheses using appropriate experimental design and statistical analysis of data.

C. *Professional and practical skills:*

C1. Use basic laboratory equipment for determinations of insecticide residue.

C2. Use appropriate software package to analyze quantitative data about the susceptibility of insects to insecticides

D. *General and transferable skills:*

By the end of this course, the students who keep attendance should be able to:

D1. Apply statistical and modeling skills.

D2. Integrate and evaluate information from a variety of sources.

D3. Transfer techniques and solutions from one discipline to another.

D4. Manage resources and time.

3. Contents

Lectures

Lecture 1	Important properties of organic compounds used for preparation of insecticides, insecticide formulations.
Lecture 2	Insecticide classification based on chemical composition, mode of entry, and mode of action.
Lecture 3	Properties, mode of action of natural organic insecticides and inorganic insecticides.
Lecture 4	Synthetic organic insecticides, chemistry of organochlorine compounds.
Lecture 5	Chemistry of carbamates and chemistry of pyrethroids and miscellaneous organic insecticides.
Lecture 6	Fate of insecticides in the soil and nteractions of insecticides.
Lecture 7	Storage of insecticides, stability and compatibility of insecticides.
Lecture 8	Insecticide control order, uses and limitations.
Lecture 9	Mechanisms of insecticide resistance(genital, physiological and biochemical)
Lecture 10	Insecticides and environmental pollution: Broad spectrum, adverse effects on nontarget arthropods.

Lecture 11	Outbreak of secondary pests. Persistence environmental pollution.
Lecture 12	Toxicity to mammals(carcinogens)
Lecture 13	Phytotoxicity. Toxicity to wild life(birds, amphibians and reptiles)
Lecture 14	Revision Assessment

Sections

Section 1	Important properties of organic compounds used for preparation of insecticides, insecticide formulations.
Section 2	Insecticide classification based on chemical composition, mode of entry, and mode of action.
Section 3	Properties, mode of action of natural organic insecticides and inorganic insecticides.
Section 4	Synthetic organic insecticides, chemistry of organochlorine compounds.
Section 5	Chemistry of carbamates and chemistry of pyrethroids and miscellaneous organic insecticides.
Section 6	Fate of insecticides in the soil and nteractions of insecticides.
Section 7	Storage of insecticides, stability and compatibility of insecticides.
Section 8	Insecticide control order, uses and limitations.
Section 9	Mechanisms of insecticide resistance(genital, physiological and biochemical)
Section 10	Insecticides and environmental pollution: Broad spectrum, adverse effects on nontarget arthropods.
Section 11	Outbreak of secondary pests. Persistence environmental pollution.

Section 12	Toxicity to mammals(carcinogens)
Section 13	Phytotoxicity. Toxicity to wild life(birds, amphibians and reptiles)
Section 14	Revision Assessment

4. Teaching and Learning Methods

- Lectures
- Practical classes

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination	Final term (June)	60%
Practical Examination	P	2 Hour Examination	Final term (June)	40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Course notes and Laboratory manual authorized by the Council of Department of zoology

Essential Books:

- *Buchech,K.H.(1983).Chemistry of pesticides. John Wiley and sons, Newyork*

Recommended Books:

Encyclopedia of insects

Web sites: Wekepedia

7. Facilities required for teaching and learning

-Projectors: Video.

-Computer Presentations and Writing Boards

-Microscopes; Compound and Stereoscopic.

-Microscopic Histological Preparations.

-Library

	Course Coordinator	Head of Department
Name	Prof. Amal I. Seif	Prof. Nabil Elfiky
Name (Arabic)	أ. د. أمال إبراهيم سيف	أ. د. نبيل الفقى
Signature	…………………………	…………………………..
Date	/9/2014	/9/2014

Matrix 1: The relationship between the aims and Intended learning outcomes

Aims	Indented learning outcomes											
	Knowledge and Understanding				Intellectual		Professional and practical		General and transferable			
	A1	A2	A3	A4	B1	B2	C1	C2	D1	D2	D3	D4
1	√	√	√	√	√	√	√	√	√	√	√	√
2	√	√	√	√	√	√	√	√	√	√	√	√
3	√	√	√	√	√	√	√	√	√	√	√	√

Matrix 2: The relationship between the contents and Intended learning outcomes

contents	Indented learning outcomes											
	Knowledge and Understanding			Intellectual			Professional and practical		General and transferable			
	A1	A2	A 3	A4	B1	B2	C1	C2	D 1	D 2	D 3	D 4
Important properties of organic compounds	√	√			√							
Insecticide classification based on chemical composition			√	√	√	√	√					
Properties, mode of action of natural organic insecticides	√			√			√	√			√	
Synthetic organic insecticides		√	√			√	√	√	√	√		
Chemistry of carbamates				√	√	√	√	√			√	√
Fate of insecticides in the soil and nteractions of insecticides.	√	√		√	√			√	√		√	√
Storage of insecticides, stability and compatibility of insecticides.			√	√			√	√	√	√		

contents	Indented learning outcomes											
	Knowledge and Understanding			Intellectual			Professional and practical		General and transferable			
	A1	A2	A3	A4	B1	B2	C1	C2	D1	D2	D3	D4
Insecticide control order, uses and limitations.	√	√			√	√						
Mechanisms of insecticide resistance(genital		√	√	√	√		√	√				
Insecticides and environmental pollution		√	√		√	√						
Outbreak of secondary pests.	√	√			√	√	√	√	√	√		
Toxicity to mammals(carcin ogens)		√	√			√	√	√	√			
Phytotoxicity. Toxicity to wild life			√	√	√	√		√	√			
Revision Assessment	√	√	√	√	√	√	√	√				
Important properties of organic compounds			√	√	√	√						
Insecticide classification based on chemical composition	√	√	√	√			√	√	√	√		
Properties, mode of action of natural organic insecticides and inorganic insecticides.			√	√	√	√	√	√	√			
Synthetic organic insecticides	√	√				√	√	√		√	√	√
Chemistry of carbamates insecticides.			√	√		√	√		√	√	√	√
Fate of insecticides in the soil	√	√	√	√			√	√				
Storage of		√	√		√	√		√	√		√	√

contents	Indented learning outcomes											
	Knowledge and Understanding			Intellectual			Professional and practical		General and transferable			
	A1	A2	A 3	A4	B1	B2	C1	C2	D 1	D 2	D 3	D 4
insecticides												
Insecticide control order												
Mechanisms of insecticide resistance												
Insecticides and environmental pollution												
Outbreak of secondary pests.												
Toxicity to mammals(carcin ogens)												
Phytotoxicity. Toxicity to wild life												
Revision Assessment												
Practical part												

Course Title	**Biological control**	
Course Code	**1651**	
Academic Year	**2014/ 2015**	
Coordinator	**Prof. Amal I. Seif**	
Other Staff		
Semester	Continous academic year	
Level	**Graduate-MSc**	
Pre-Requisite	**B. Sc, or equivalent degrees**	
Course Delivery	**Lecture**	**2h lectures /week**
	Practical	**2h practicals/week**
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

This module aims to enable students to

1- Acquire knowledge and understanding of insect pathogens and biotechnology. principle groups of entomopathogene.
2- Demonstrate the methods used in biological control of insects and other arthropods (by using predators and parasitoids) ,pathogens and entomopathogens ,nematodes.
3- Understand the biological control of weeds using plant feeding insects and other arthropods to show sources of information about biological control and those who practice it to teach the relevant aspects of lows that govern the practice of biological control.

2. Intended Learning outcomes

A. Knowledge and understanding:

Upon successful completion of this course the student should be able to:

A1. Describe the natural limitation of populations (abiotic and biotic); classical biological control.

A2. Explain augmentative biological control.

A3. Explain assessing effects of biological control agents, partitioning mortality of pests.

A4. Explain DNA characterization of insect viruses, insect cell culture-characterization in vitro replication of NPV in insect cells-in vitro and in vivo recombinants of NP.

B. Intellectual skills:

They will also acquire the ability to

B1. Demonstrate manipulation of antimicrobial defense systems for pest control.

B2. Demonstrate the technology for fungal pathogens-protoplast fusion.

***C. Professional and practical skills*:**

C1.Assess inset viruses, bacteria, fungi, protozoa and histopathology of infection.

C2. Use computer package to evaluate improved strains.

C3. Examine in vivo and in vitro production-genetic improvement of *Bacillus thuringenesis*

*D**. General and transferable skills**:*

D1. Write reports including graphical material and give oral presentation.

D2. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills and to seek and apply to suitable employment.

D3. Life-long learning and self development.

3. Content

- Studying principal groups of entomopathogens, bacteria, bacculoviruses, fungi, protozoa and nematodes.
- Molecular characterization of insect bacculoviruses and bacteria.
- Molecular characterization of insect fungi and protozoans.
- Mode of entry and replication of bacteria.
- Mode of entry and replication of protozoans.
- Mode of entry and replication of fungi.
- Host resistance to entomopathogenes.
- Manipulation of antimicrobial defense system for pest control.
- Genetic improvement of bacculovirus-strains, characterization serial passage, mutation, in vitro recombination.
- Genetic engineering of bacculoviruses.
- Cloning of foreign genes into IVPV.
- Insect cell lines.
- Cloning and characterization of insect cell lines.
- Fusion of insect cells and applications.
- In vitro production of bacculoviruses and preparation of inoculum, effect of media, clonal cell lines, use of stationary culture, large volume culturing, production and fermentation, semiculture.
- Strain development in bacteria.
- Genetic improvement of *Bacillus thuringineses*, strain selection, identification and characterization
- **Practical part with the same topics shown above**

4. Teaching and Learning Methods

- Lectures
- Practical classes

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferabl

6. List of references

Course notes:

Course notes and Laboratory manual authorized by the Council of Department of Zoology.

Essential Books:

Recommended Books:

Web sites:

7. Facilities required for teaching and learning

- Projectors: Video.
- Computer Presentations and Writing Boards
- Microscopes; Compound and Stereoscopic.
- Library

	Course Coordinator	Head of Department
Name	Prof. **Prof. Amal I. Seif**	Prof. Nabil Kamal Elfiki
Name (Arabic)	أ. د. / أمال إبراهيم سيف	أ. د.نبيل كمال الفقى
Signature	……………………………	……………………………..
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs											
	KU				I		P			T		
	A1	A2	A3	A4	B1	B2	C1	C2	C3	D1	D2	D3
Studying principal groups of entomopathogens, bacteria, bacculoviruses, fungi, protozoa and nematodes.	√											
Molecular characterization of insect bacculoviruses and bacteria.	√											
Molecular characterization of insect fungi and protozoans.	√											
Mode of entry and replication of bacteria.	√											
Mode of entry and replication of protozoans.	√											
Mode of entry and replication of fungi.	√											
Host resistance to entomopathogenes.					√							
Manipulation of antimicrobial defense system for pest control.		√	√									
Genetic improvement of bacculovirus-strains,				√								

characterization serial passage, mutation, in vitro recombination.												
Genetic engineering of bacculoviruses.				√								
Cloning of foreign genes into IVPV.				√								
Insect cell lines.				√								
Cloning and characterization of insect cell lines.				√								
Fusion of insect cells and applications.				√		√						
In vitro production of bacculoviruses and preparation of inoculum, effect of media, clonal cell lines, use of stationary culture, large volume culturing, production and fermentation, semiculture.				√								
Strain development in bacteria.				√								
Genetic improvement of *Bacillus thuringineses*, strain selection, identification and characterization				√								
Practical part with the same topics							√	√	√	√	√	√

Course Title	**Medical entomology**	
Course Code	**1653**	
Academic Year	**20١4/ 20١5**	
Coordinator	**Prof. Amal I. Seif**	
Other Staff	**Prof. Ibrahim Bakr**	
Semester	**The first and second semesters**	
Pre-Requisite	**B. Sc, and equivalent degrees**	
Course Delivery	**Lecture**	**2h lectures /week**
	Practical	**2h practicals/week**
Parent Department	**Zoology Department**	
Date of Approval	**September, 2014**	

1. Aims

This course enables the students to

1- Gain knowledge and understanding of the biology and diversity of medically important insects and other arthropods and their associated diseases.
2- Following introduction emphasizing basic principles and concepts of medical and veterinary entomology.

2. Intended Learning outcomes

A. Knowledge and understanding:

Upon successful completion of this course the student should be able to:

A1. Describe the entomological principles of insect identification, insect physiology, insect toxicology, and insect ecology.

A2. Mention insect and tick-borne diseases

A3. Identify insects, ticks, and other arthropods of public health importance; develop control programs

***B. Intellectual skills**:*

They will also acquire the ability to

B1. Demonstrate medical entomology with responsibility for mosquito, fly, tick, lice, or rodent control programs.

B2. Compare between symptoms of different diseases transmitted by insects

C. Professional and practical skills:

C1. Use computer research on vector-borne diseases, and on the physiology and taxonomy of medically important arthropods.

C2. Planning and directing comprehensive method for control of pests and animals affecting human health and the environment .

D. General and transferable skills:

D1. Use the internet

D2. Prepare a research plan (proposal)

D3. Prosecutes a research by applications of laboratory or field techniques.

D4. Gain both written and oral communication skills.

D5. Use databases and library search methods.

3. Contents

- Introduction, overview of arthropods.
- Arthropods and diseases: concepts and principles
- pathogen biology and medical insect morphology
- allergy and arthropods
- venomous arthropods and entomophopia
- lice and lice borne diseases, fleas and flea borne diseases, mosquitoes and mosquito born diseases, biting flies and diseases
- tick and tick borne diseases, mite and mite borne diseases
- mechanism of transmission of leishmania
- glossinanatomya and glossina borne disease tse-tse, bed bug, cone-nose bugs
- family simuliidae (black flies), family psychodidae(sand flies)
- family ceratopogonidae(biting midges)
- family tabanidae(horse flies), hyppoboscidae
- muscid flies , myiasis
- **Vector control.**

Practical part has the same topics shown above.

4. Teaching and Learning Methods

- Lectures

- Practical classes

5. Student Assessment

Assessment Method	**Skills assessed***	**Assessment Length**	**Schedule**	**Proportion**
Written Examination	KU, I	3 Hour Examination		60%
Practical Examination	P	2 Hour Examination		40%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Course notes and Laboratory manual authorized by the Council of Department of Zoology.

Essential Books:

Web sites:

7. Facilities required for teaching and learning

-Projectors: Video.

-Computer Presentations and Writing Boards

-Microscopes; Compound and Stereoscopic.

-Microscopic Histological Preparations.

-Preserved Representative Models.

-Museum, Library

	Course Coordinator	Head of Department
Name	Prof. **Prof. Amal I. Seif**	Prof. Nabil Kamal Elfiki
Name (Arabic)	**أ. د. / أمال إبراهيم سيف**	**أ. د.نبيل كمال الفقى**
Signature	…………………………	…………………………..
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs											
	KU			I		P		T				
	A 1	A 2	A 3	B 1	B 2	C 1	C 2	D 1	D 2	D 3	D 4	D 5
Introduction, overview of arthropods.	√											
Arthropods and diseases	√			√								
pathogen biology and medical insect morphology	√											
allergy and arthropods	√											
venomous arthropods and entomophopia	√											
lice and lice borne diseases, fleas and flea borne diseases	√			√	√							
tick and tick borne diseases, mite and mite borne diseases	√	√		√	√							
mechanism of transmission of leishmania	√				√							
glossinanatomya and glossina borne disease tse-tse	√				√							
family simuliidae (black flies)	√				√							
family ceratopogonidae(biting midges)	√				√							
family tabanidae(horse flies), hyppoboscidae	√											
muscid flies , myiasis	√											
Vector control.			√	√								
Practical part						√	√	√	√	√	√	√

Course Title	Biostatistics	
Course Code	23094	
Academic Year	2014/2015	
Coordinator	Prof. Abd-Elmoneim Anwar Mohamed	
Other staff		
Semester	The first and second terms	
Pre-Requisite	B. Sc. Zoology	
Course delivery	Lecture	1h lectures/week
	Practical	-
Parent Department	Mathematics Department	

1. Aims

- provide M. Sc. students in biology with basic concepts of study design and data analysis suitable for laboratory and field research

- to help students to develop the skills needed to apply statistical methods using related statistical software; e.g. Primer or GraphPad in scientific biological research. Emphasis will be on practical and applied skills using example of relevance to biology students.

2. Intended Learning outcomes

A. Knowledge and understanding:

By the end of this course the students should be able to*:*

A25. Enumerate statistical measures for data description; statistical estimation; correlations and testing hypothesis understand the basic principles of study design.

A26. Describe the types of variables that are used in biological research.

A27. Explain the role of sampling variation, to quantify the variability, and its role in comparing groups or categories.

B. Intellectual skills*:*

B21. Discuss confidently simple essential statistical methods in biological research and to interpret results.

B22. select appropriate statistical methods for analysis of simple data sets and apply them on a computer using bio-statistical software, GraphPad.

B23. summarise data using graphical and tabular data.

B24. interpret research findings and explain them in a clear, concise and logical manner.

C. Professional and practical skills

C16. Select and apply appropriate basic statistical methods for analysis of data.

C17. Use GraphPad package in data analysis.

C18. Tackle skills in handling data on a computer and otherwise, and deriving and presenting quantitative results using appropriate tables, figures, and summaries.

D. Transferable skills

D19. Write report including graphical material.

D20. Present and discuss the finding from statistical analysis in a clear, concise and logical manner.

D21. Use internet and other electronic sources as a source of information.

3. Contents

Analysis and design of research studies (two hours/week)

Lectures 1	Introduction: Variables and distributions.
Lectures 2-3	Summarizing data.
Lectures 4-5	Sampling variability of a mean.
Lectures 6-7	Analysis of quantitative data: Comparing means: comparing two samples.
Lectures 8-9	ANOVA: Comparing more than two samples.
Lecture10	Examination.
Lectures 11-12	Sampling variability of proportions.
Lectures 13-14	Analysis of categorical data; comparing two proportions
Lectures 15-16	Regression and correlation.
Lectures 17-18	Comparing correlations and regression. Multiple regressions.
Lectures 19-20	Regression and correlation: Computer applications.
Lectures 21-22	Comparing distribution: Computer applications.
Lectures 23-24	Comparing means: Computer applications.
Lectures 25-26	Comparing variances: Computer applications.
Lectures 27-28	Design of experiments: The null hypothesis, statistical significance and rejecting the null hypothesis.
Lectures 29-30	Revision
Weeks 31, 32	**Assessment**

4. Teaching and Learning Methods

- Lectures are an integral part of course delivery in this course, supported by problems classes, tutorial groups, computational work, office hours, and individual tutorials.

- Students engage in private study in which they work through set problem sheets and individual assignments as well as assimilating lecture content.

5. Student Assessment

Assessment Method	**Skills assessed***	**Assessment Length**	**Schedule**	**Proportion**
Written Examination	KU, I	3 Hour Examination	The 32 Week	90%
Oral Assessment	KU, I	Assessment Session	Term Final	5%
Semester work	KU, I	Continuous Assessment		5%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Essential books

- Glantz, Stanton A. (2005): Primer of Biostatistics, 6th Edition McGraw-Hill.

Recommended books

- Samuels, M. L. (1989): Statistics for the Life Sciences. Dellen Publishing Company, USA.
- Rosner, B. (1990): Fundamentals of Biostatistics. PWS-Kent Publishing Company, USA.

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computers Presentations and Writing Boards
- Primer or GraphPad biostatistics software.

	Course Coordinator	**Head of Department**
Name	Prof. Abd-Elmoneim A. Mohamed	**Prof. . Qadry Zakaria**
Name (Arabic)	أ. د. عبد المنعم محمد طعيمه	أ. د. قدرى زكريا
Signature	………………………………	……………………………..
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs													
	KU				I				P			T		
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3
Introduction	√	√	√	√										
Summarizing data.	√	√	√	√										
Sampling variability of a mean.	√	√	√	√										
Analysis of quantitative data	√	√	√	√										
ANOVA	√	√	√	√	√	√	√	√						
Examination.	√	√	√	√										
Sampling variability of proportions.	√	√	√	√										
Analysis of categorical data	√	√	√	√		√								
Regression and correlation.	√	√	√	√										
Comparing correlations and regression.	√	√	√	√										
Regression and correlation	√	√	√	√					√	√	√	√	√	√
Comparing distribution	√	√	√	√					√	√	√	√	√	√
Comparing means	√	√	√	√					√	√	√	√	√	√
Comparing variances	√	√	√	√					√	√	√	√	√	√

Course Title	**Computer**	
Course Code	1657	
Academic Year	**2014/2015**	
Coordinator	**Prof. Mohamed El-Awady**	
Other Staff	**Prof. Mahmoud Kamel, Prof. Ahmed El-Shishtawy, Prof. Qadry Zakaria**	
Semester	**Taught over 2 semesters**	
Pre-Requisite	**B.Sc.**	
Course Delivery	**Lecture**	**1h lecture/week**
	Practical	**1h practical/week**
Parent Department	**Computer Centre**	
Date of Approval	**September, 2014**	

1. Aims

This course will enable students to acquire a range of transferable skills that are important for post graduate M. Sc. students to:

- Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.
- Underpin academic work throughout postgraduate studies.
- Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

A. Knowledge and understanding:

Upon successful completion of this course the students should be able to:

A1. Mention the use of IT in the context of the postgraduate studies.

A2. Define the diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.

A3. Describe different photo enhancing and manipulation techniques.

B. Intellectual skills:

They should also acquire the ability to:

B6. Integrate different application programs to develop effective information analysis and presentation.

B7. Solve scientific problems using computer programming.

C. Professional and practical skills:

C1. Use a number of computer packages to present information.

C2. Prepare presentation using sophisticated software packages.

C3. Make use of different internet resources.

C4. Carry out necessary graphical, statistical and frequency analyses of different types of data

D. General and transferable skills:

D5. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Methods for graphical representations, Data analysis and Data modeling

Assignment 1 : **Using Application programs**

Calculation of Slope and intersection of lines ,

Best fitting for data,

Extracting Trend , and Equations for acquired data (linear –exponential-logarithmic ….etc)

Statistical Data analysis

Assignment 2 : **Using Application programs**

Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data

Creating powerful presentation including charts, images, video, etc and different attractive animations

Assignment 3 : **Using PowerPoint program**

Design a real and powerful presentation with different acquired skills

Use of internet capabilities and searching engines

Assignment 4: Using the Internet

Life search on the internet for some real information

Creating Data Base and related Queries and Reports

Assignment 5: Using Application programs

Creating a real Data Base and apply different queries and reports to extract useful information

Computer programming language

Assignment 6: Programming using Visual Basic 6

Solving real problems using a computer language

Photo manipulation and enhancement using the photoshop

Assignment 7: **Using the Photoshop program**

Practicing on manipulation and enhancing of images

Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities

4. Teaching and Learning Methods

- Lectures
- Practical classes
- Assignments

The course is delivered through lectures, practical sessions and assignments. Team working skills are developed on a week-long laboratory exercises and the students present and defend their findings in a public seminar.

5. Student Assessment

Assessment Method	Skills assessed*	Assessment Length	Schedule	Proportion
Written Examination	KU, I	1 Hour Examination	Term Final	60%
Practical Examination	KU, I	1 Hour Examination t	Term Final	30%
Semester work	P, T	Continuous Assessment		10%

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

6. List of references

Course notes:

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

	Course Coordinator	Head of Department
Name	Prof. Mohamed M. El-Awady	Prof. EL Sayed Taha Rizq
Name (Arabic)	أ.د.محمد العوضي	أ.د. السيد طه رزق
Signature	………………………………	………………………………………..
Date	/9/2014	/9/2014

Course title	Intended learning outcomes ILOs									
	KU							I	P	T
	A1	A2	A3	A4	A5	A6	A7	B1	C1	D1
Methods for graphical representations, Data analysis and Data modeling										
Assignment 1 : Using Application programs	√	√	√	√	√	√	√			
Statistical Data analysis	√	√	√	√	√	√	√	√		
Assignment 2 : Using Application programs	√	√	√	√	√	√	√	√		
Creating powerful presentation	√	√	√	√	√	√	√			
Assignment 3 : **Using PowerPoint program**	√	√	√	√	√	√	√		√	
Use of internet capabilities and searching engines	√	√	√	√	√	√	√			√
Assignment 4: Using the Internet	√	√	√	√	√	√	√			√
Creating Data Base and related Queries and Reports	√	√	√	√	√	√	√			
Assignment 5: Using Application programs	√	√	√	√	√	√	√			
Computer programming language	√	√	√	√	√	√	√			
Assignment 6: Programming using Visual Basic 6	√	√	√	√	√	√	√			
Photo manipulation and enhancement using the photoshop	√	√	√	√	√	√	√			
Assignment 7: **Using the Photoshop program**	√	√	√	√	√	√	√			

Postgraduate

Program and Course Specifications

Botany

2014 - 2015

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M.Sc. Program of Ecology

Tanta University, Faculty of Science

M. Sc. program specifications of Ecology

Department offering the program	Botany Department
Academic year	2014-2015
Date of specification approval	08/2014

A- Basic Information

Program title:	M. Sc. degree in Botany (Ecology)
Program type	Single
Coordinator:	Prof. Kamal Hussein Shaltout
External Evaluator (s):	Prof. Mahmoud El-Baz Younis. Faculty of Science - Mansoura University.
QAA Benchmarking Standards	Academic Reference Standards (ARS)
Program References	Bioscience, Egyptian Code of Assessment
Date of Delivery	Every year in September
Review Date	Internal Periodic Review, Summer 2014

B- Professional Information

1. Program aims

This program gives an opportunity to:

- Provide students with the main basic and updated concepts of ecology at advanced level.
- Deliver students with a broad understanding of the fundamental principles of system analysis, vegetation distribution and edaphic factors controlling it.
- Study the vegetation diversity aspects.
- Equip students with IT.

2. Intended Learning outcomes

A. Knowledge and understanding:

By the end of the programme successful students who have attended regularly and completed required work will be able to know and understand of:

A.1 Understand vegetation ecology

A2. Evaluate information of plant distribution and factor affecting it.

A3. Organize and integrate information of plant phytosociology, climatology and geology

B. Intellectual skills:

By the end of the program successful students who have attended regularly and completed required work will be able to:

B1. Access plant ecology information from a variety of sources and to communicate the principles in a manner appropriate to their study.

B2. Identify between vegetation and flora of an area.

B3. Evaluate literatures in plant ecology

B4. Read and use the literatures with critical understanding, give a clear and accurate account of the subject matter, think independently, formulate arguments and engage in debate.

C. Professional and practical skills:

At the end of this module students should have acquired the following skills:

C1. demonstrate flora and species distribution.

C2. analyze chemical and physical characteristics of soil.

C3. analyze, summarize and integrate information critically from a variety of media.

D. General and transferable skills:

By the end of the program successful students who have attended regularly and completed the proposed work will be able to:

D1. Communicate scientific ideas, give oral and poster presentations and work as part of a research team.

D2. Use databases and library search methods

D3. Use library resources and other information sources.

D4. Plan their career.

3. Academic standards

3.A External references for standards (Benchmarks):

In order to fulfill international standards, our students should acquire

I. Knowledge and Understanding:

Approaches to study and forms of subject knowledge likely to be common to Ecology degree programme will include the following:

knowledge and understanding of the processes and mechanisms of ecosystem from soil to air level, from uptake of energy to its utilization in the community and their environmental benefits.

- engagement with the essential facts, major concepts, principles and theories associated with Ecology.
- understanding of information and data, and their setting within a theoretical framework.
- familiarity with the:
- Classification systems as appropriate.
- Methods of acquiring, interpreting and analyzing of ecological information with a critical understanding of the appropriate contexts for their use through the:
- Study of texts.
- Original papers.
- Reports and data sets.
- Developing knowledge about the diversity of ecosystems and its evolution.
- Knowledge of a range of practical techniques and methodologies, including:
- Data analysis.
- Use of statistics.
- Engagement with current developments in ecology and their applications, and the philosophical and ethical issues involved.
- The applicability of the biosciences (Ecology) to the careers to which graduates will be progressing.

II. Skills

A. Generic skills

- An appreciation of the complexity and diversity of life processes through the study of plant phytososciaology, flora of the area, soil nutrients and environment, climatic parameters, and the interrelationships between plants and their environment.
- Tthe ability to read and use appropriate literature with a full and critical understanding.
- The capacity to give a clear and accurate account of a subject
- Critical and analytical skills: a recognition that statements should be tested and that evidence is subject to assessment and critical evaluation.
- The ability to employ a variety of methods of study in investigating, recording and analyzing microbiological topics or idea of research
- The ability to think independent, set tasks and solve problems.

B. Key skills (graduate)

The specific key skills that should be developed in Ecology degree courses are subdivided into:-

1. Intellectual skills

- Recognizing and applying subject-specific theories, concepts or principles. For example:
- The relationship between plant species in each habitat.
- The nature of essential nutrients in the ecosystem
- Analyzing and summarizing information critically, including published research or reports;
- Obtaining and integrating several lines of subject-specific evidence to formulate and test hypotheses;

Applying subject knowledge and understanding to address familiar and unfamiliar problems

2. Practical skills

- Designing, planning, conducting and reporting on investigations. The data may be obtained through:
- Individual.
- group projects.
- Obtaining, recording, collecting and analyzing data using appropriate techniques in the field and/or laboratory, working by themselves or in a group.
- Undertaking field and/or laboratory investigations of living systems in a responsible, safe and ethical manner.
- Preparing, processing, interpreting and presenting data, using appropriate qualitative and quantitative techniques:

- Statistical programmes.
- Spreadsheets.
- Programs for presenting data visually.

- Solving problems by a variety of methods including the use of computers.
- Using the internet and other electronic sources critically as a means of communication and a source of information.

3. Interpersonal and teamwork skills

- Identifying individual and collective goals and responsibilities and performing in a manner appropriate to these roles.

- Recognizing and respecting the views and opinions of other team members.
- Negotiating skills.
- Evaluating performance as an individual and a team member; evaluating the performance of others.
- Developing an appreciation of the interdisciplinary nature of science and of the validity of different points of view.

4. Self-management and professional development skills

- Developing the skills necessary for self-managed and lifelong learning (e.g. working independent, time management and organization skills).
- Identifying and working towards targets for personal, academic and career development.
- Developing an adaptable, flexible, and effective approach to study and work.

3.B Comparison of provision to external references:

International Academic Standards (NARS)

Although the provision is quite comparable to its benchmark there are a number of points that should be highlighted for the purpose of achieving advancement in the specifications and qualities of the Ecology program at Botany Department, Faculty of Science, Tanta University as follows:

- Search of vegetation distribution in the different habitat, flora of the area, and controlling edaphic conditions.
- Have skill of performing diverse laboratory techniques of plant and ecosystem analysis important in the improvement of environmental ecosystems.
- Furthermore, have skills of performing Laboratory and field investigation of the pollutants.
- Ecology students should acquire proper skills to keep up with the ecological literature and to appreciate the need for life-long continuing education, starting the day after their graduation.
- Students should have the aptitude of critical evaluation, synthesis and interpretation of botanical information and data, production of botany-specific scientific documentation, and presentation of botanical information and arguments clearly and correctly in writing and orally, to both specialist a

4.a.Program duration: Minimum two years.

4.b.Program Structure:

4. b.1. The First Preliminary Year:

All applicants admitted to the master's program are required to study 9 selected theoretical and practical courses approved by the department council from the master courses offered by the department for one academic year. A part of the M.Sc. courses offered by the Botany Department, the student should study a course in English language for a minimum one hour per week. Albeit, students who have taken equivalent English language course may be exampled from it upon the recommendation of the Faculty Council.

No. of hours per week: 6 Lectures and 12 hours practical

The registration for the preliminary year takes place in October, and the final exam. Is held once a year (June) in the date approved by the Faculty Council.

Grade Assessment:

Final Written Exam.60%
Final Practical Exam 40%
*< 60% failed
60-69 passed, 70-79 good, 80-89 very good, >90% excellent
*Failed students can repeat the course (s) only once.

4. b.2. The second year:

If the student passes the final examination, he/she will be a legible for continuation and registration to carry out research and starts thesis preparation. The thesis could be submitted after one year.

5. Program Contents

N	Code	Course Name	Lecturer
1	1511	Methods of vegetation analysis, population ecology and germination and advanced studies on the phytosociology	Prof. Dr. Kamal Shaltout Prof. Dr. Mohamed El-Beheiry
2	1512	Climatology- Advanced studies on soil physics and soil chemistry-Plant Water relations	Prof. Dr. Mohamed nabeih El-Shorbagy Prof. Dr. Ahmed Sharaf El-Din Prof. Dr. Mohamed El-Beheiry
3	1513	Principles of geology and geological screening	Prof. Dr. Mahmoud Hussein Ashmawy
4	1514	Precise principles of flowering plant systematic, palynology and flora	Dr. Ragab El-Fahar Dr. Dalia Abd El-Azeem Ahmed
5	1517	Computer	Prof. Dr. Mohamed El-Awady.
6	1518	Biostatistics	Prof. Dr. Kamal Shaltout Dr. Mohamed Abdelmonsef

Course Contents of plant Ecology

Course Name	Code No	Contents
Methods of vegetation analysis, population ecology and germination and advanced studies on the phytosociology	1511	Introduction to methods of vegetation analysis. Community sampling, measuring species quantities. Count plot method and plotless sampling techniques. Mathematical treatment of vegetation data. Direct gradient analysis and ecological diversity. Production ecology, Life tables and simple models, Regulation of plant populations. Demography of some plant populations, Evolutionary ecology. Interactions in mixtures of species. Coexistence and the niche. Life form and Stratification. Quantitative assessment of abundance frequency symbols. Quantitative assessment of abundance. Statistical and sampling methods. Transect and isonomic studies. Vegetation change and plant succession.Casual factors of inter-species associations.
Climatology-Advanced	1512	**Part 1 Climatology**

studies on soil physics and soil chemistry-Plant Water relations		Air temperature. Atmospheric moisture and precipitation Light. Heat budget of the earth's surface. Temperature relationships near the ground. Humidity relationships near the ground. Wind relationships near the ground **Part2 Soil physics and chemistry** Importance, Definition, Composition and development of soil Type of soil classification. Soil texture, structure, porosity, air, water and living organisms. Soil erosion and conservation Management of soil physical properties. Soil solution, soil acidity, and alkalinity. Soil inorganic compounds. Composition and transformation of organic matter. Electronic properties of soil. Properties of soil colloids. Soil cartography and its importance **Part3 Plant water relations** Drought and origin of adaptation to water stress. Low and high soil-water potentials. Osmotic regulation and water stress in higher plants. Water transport and relationship to growth processes. Metabolic responses of plants to water deficits. Cell-level metabolic responses. Effect of water deficits on metabolism Adaptive significance of metabolic responses to water deficits
Principles of geology and geological screening	1513	Earth outer layer, Major structural unit of Earth, Hydrologic system, Basic concept of physical geology, Geologic surveying and Aerology.
Precise principles of flowering plant systematic, palynology and flora	1514	**Part 1**: Precise principles of flowering plant systematic and studying flora Introduction to methods of plant taxonomy. Explain the different modern methods of plant taxonomy. Identification of botanical garden and its importance. Definition of herbarium, its role in plant taxonomy and its importance. How to construct herbarium? Methods to keep specimens in Herbarium. How to use floral books in Identifications (Gramineae - Compositae - Crucifereae and Leguminosea). **Part 2: Palynology and its application** Identify the mean of palynology. Identification of pollens and how they are formed. Types of pollination and Pollen morphology. Sporoderm and simple and compound apertures. Chemical composition of pollen grain Spores of Pteridophyta and evolution of spores and pollens. Microfossils and geology. Pollen and taxonomy of Angiosperms.
Computer	1517	Visual basic, power point, internet and Photoshop program
Biostatistics	1518	Part one: Statistical definitions, sampling of attributes, distributions (Normal, Binomial, Poisson), and tests of significance, Part two: Analysis of variance, experimental designs, association between variables, curve fitting and the method of least square, multiple and partial correlation and regressions, and analysis of time series.

Thesis

Thesis is an essential aspect of M.Sc. program, for partial fulfillment of M.Sc. degree requirements. It is a formal written document representing sustained original research into an important intellectual issue. The thesis must be an independent effort which contributes to the accumulated understanding of the field in which it is written. The required research preparation and advanced research methods will help the student to focus his or her research effort, and provide general guidelines for research approach and report preparation. Thesis must meet precise academic standards and will be reviewed and approved by the candidate's supervising professor and external academic review committee.

The thesis should contain at least the following:

- Title page (title, name of student, university, faculty, name of program, date, supervisors
- Table of contents
- Introduction, containing a definition of the thesis statement, working method, the theoretical framework, and the aim.
- Literature review.
- Materials and methods.
- Results
- Discussion and conclusions
- References.

Language of the thesis

The thesis must be written in English language accompanied by a summary in Arabic.

Formation of Examiners Committees

A committee is selected by Botany Department Council. The M.Sc. Degree is awarded to the applicant by University, upon the recommendation of the department and the Faculty Council.

7-Admission:

An applicant for admission to the master’s program should hold Botany B.Sc. degree in science either major with a minimum grade “Good” or double major with a minimum general grade “Good” from any Egyptian or equivalent institute. In addition, all applicants must satisfy the department graduate admission.

8- Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1 Alumni	Questionnaire	
2- Stakeholders (Employers)	Questionnaire	
3- External Evaluator(s)	Report	

Program coordinator:

Prof. Kamal Hussein Shaltout
Head of Department: Prof. AlaaAbou-Zeid

Date: 8/2014

M. Sc. program Plant (Ecology) matrix

Tanta University, Faculty of Science

M. Sc. Course specifications of Ecology

A- Basic Information

Course Title	**Methods of vegetation analysis, population ecology and germination and advanced studies on the phytosociology**	
Course Code Academic Year Coordinator Other Staff Pre-Requisite Semester	**1511** **2014/2014** **Dr. Kamal Shaltout** **Dr. Mohamed El-Beheiry** **GC level Biology or its equivalent** **Part one: Method of vegetation analysis, population ecology and germination (Two semesters).** **Part two: Advanced studies on phytosociology (one**	
Course Delivery	**Lecture** **Practical**	**Part one (28 x 1h lectures)** **Part two: (14 x 1h lectures)** **Part one (28 x 2h practical)** **Part two (14 x 2h practical)**
Parent Department Date of Approval	**Botany Department** **8, 2014**	

B- Professional Information

2. **course aims:**

Teach students the modern vegetation and plant population sciences and their applications, teach students how to analyze the population changes and their causes throughout the life cycle, achieve a comprehensible form of the too much vegetation data that characterize the modern vegetation science and population ecology and apply statistical tests and multivariate analysis for evaluating the differences, variations and associations between the plant populations and communities.

3. **Intended learning outcomes of course (ILOs)**

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Recognize the vegetative analysis methods

A2. Identify the modern vegetation and plant population sciences and their applications

A3. Explain the population changes and their causes throughout the life cycle.

A4. Describe the different methods of the community and population analyses.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B1. Apply the statistical tests and multivariate analysis for evaluating the differences, variations and associations between the plant populations and communities

B2. Analyze the population changes and their causes throughout the plant life cycle.

B3. Compare the different methods of the community and population analyses

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-

C1. Use the suitable techniques for studying the plant populations and communities.

C2. Execute a consultation on the vegetation science and population ecology for the students and researchers of biology.

C3. Prepare the suitable experimental field and lab designs on the subject of the course and how to analyze the results statistically.

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-

D1. Prepare a research proposal on a topic of the course

D2. Demonstrate written and verbal communication skills on modern approaches in the vegetation and plant population sciences.

D3. Prepare an essay on the topics of the course and its application.

D4. Use databases and library search methods as well as internet sites

3. Contents

Week	Topic (2 hour/week)
	Part one: Plant vegetation, Population ecology and germination (an hour/week).
1	Introduction to Methods of Vegetation Analysis
2	Community sampling, measuring species quantities
3	Count-plot method
4	Plotless sampling techniques
5	Mathematical treatment of vegetation data 1
6	Mathematical treatment of vegetation data 2
7	Direct gradient analysis 1
8	Direct gradient analysis 2
9	Ecological diversity 1
10	Ecological diversity 2
11	Production ecology
12	Round-up discussion on the previous topics
13	Partial examination
14	Introduction to Population Ecology
15	Life tables
16	Simple models 1
17	Simple models 2
18	Regulation of plant populations

19	Demography of some plant populations 1
20	Demography of some plant populations 2
21	Colonial plants
22	Evolutionary ecology 1
23	Evolutionary ecology 2
24	Interactions among mixtures of species
25	Coexistence and the niche
26	Round-up discussion on the previous topics
27	Partial examination
28	Assessment
	Part two: advanced studies on Phytosociology (an hour/week).
1	Introduction to Phytosociology
2	Life forms and Stratification 1
3	Life forms and Stratification 2
4	Horizontal distribution
5	Subjective assessment of abundance frequency symbols
6	Quantitative assessment of abundance
7	Statistical and Sampling methods 1
8	Statistical and Sampling methods 2
9	Transect and isonomic studies
10	Vegetation change and Plant succession 1
11	Vegetation change and Plant succession 2
12	Causal factors of inter-species associations
13	Round-up discussion on the previous topics
14	Assesement
	Practical Lessons.
	Part one: plant vegetation, population ecology and germination **(2 hours/week)**
1	Determination of germination rate of different seeds influenced by precipitation times.
2	Determination of natality , mortality and growth rate of some plant populations.
3	Study of the producyivity of some plant populations under different habitat conditions.
4	Study the effect of seed size on growth rate and biomass.
	Part two: **advanced studies on Phytosociology (2 hours/week)**
5	Determination of the minimal area of plant community using nested plot
6	Measure of plant density and frequency using quadrate method.
7	Measure of plant density and frequency using point centered quarter method.
8	Determination of plant cover by Praun Plankia technique.
9	Determination of adequacy of sample size using the running mean method.
10	Determinations of plant cover using point-intercept method.
11	Measurements of plant cover using line intercept method.
12	Determination of species diversity indices and dominance –diversity curves.
13	Assesement of degree of association between plant communities.
14	Classification of vegetation groups using Tabular comparison.
15	Determination of degree of similarities between plant communities.
16	Classification of vegetation groups using agglomerative clustering technique.

4. Teaching and learning methods

a. Lectures ☒
b. Practical training / laboratory ☒
c. Seminar / Workshop ☐
d. Class Activity -

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P,T
Semester work	to assess	

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

Assessment schedule

Assessment 1	Practical exam	Week	After week 28
Assessment 2	Final exam	Week	After week 28

Weighing of assessments

Final-term Examination	60	%
Practical Examination	40	%
Semester work		%
Total	100	%

5. List of references

Course notes

Course notes and Laboratory manual authorized by the Council of Department of Botany.

Essential books (text books)

Mueller-Dombois, E. & Ellenberg, H. 1974. Aims and Methods of Vegetation Ecology. John Wiley & Sons, New York.
Silvertown, J. 1987. Introduction to Plant Population Ecology. Longman Singapore Publishers (Pte) Ltd, Singapore.

Recommended books

Kent, M. & Coker, P. 1996. Vegetation Description and Analysis. John Wiley & Sons, New York.

6. Facilities required for teaching and learning

Computer Presentations and Writing Boards
Library

Course coordinator:

Prof. Kamal Shaltout

Head of Department:

Prof. Alaa Abou-Zeid

Date: 8/ 2014

Course Contents – Course ILOs Matrix

Course code:1511, course title: Plant vegetation analysis, population ecology and germination and Advanced studies in plant phytosociology.

Course Contents	Practical	Weeks	Knowledge				Intellectu			Practical			Tranferrable			
			A	A	A	A	B	B	B	C	C	C	D	D	D	D
Part one:																
Introducti		1	✓	✓	✓	✓										
Communit		2	✓	✓	✓	✓	✓	✓	✓							✓
	Determination of germination rate of different									✓	✓					
Count-plot		3	✓	✓	✓	✓							✓	✓	✓	✓
	Determination of germinatio									✓	✓	✓				
Plotless		4														✓
	Determination of natality									✓	✓					
Mathemat		5, 6	✓	✓	✓	✓							✓	✓	✓	✓
	Determination of natality									✓	✓					
Direct		7, 8	✓	✓	✓	✓	✓									✓
	Study of the producvivi									✓	✓	✓				
Ecological		9,						✓	✓						✓	✓
	Study of the									✓	✓	✓				
Production		11	✓	✓	✓											✓
	Study the effect of									✓		✓				
Introducti		12	✓	✓	✓	✓	✓	✓	✓						✓	✓
	Study the effect of										✓	✓				
Life tables		13	✓	✓												✓
	Determination of the minimal										✓	✓	✓			
Simple		14,1	✓	✓												✓
	Measure of plant density										✓	✓	✓			
Regulation		16	✓	✓	✓	✓				✓				✓	✓	✓
	Measure of plant density										✓	✓	✓			
Demograp		17,							✓	✓						✓
	Determination of plant										✓	✓				
Colonial		19	✓	✓	✓	✓	✓	✓	✓							✓

	Determination of adequacy										✓	✓				
Evolutiona		20,				✓	✓	✓	✓							✓
	Determinations of plant											✓	✓			
Interaction		22				✓	✓	✓	✓					✓		
	Measurements of plant											✓	✓			
Coexistenc		23				✓	✓	✓	✓		✓	✓	✓	✓		
	Determination of species										✓	✓				
Part two:																
Introducti		1	✓	✓										✓		
Life forms		2, 3	✓	✓						✓				✓		
	Assessment of degree of										✓	✓	✓			
Horizontal		4	✓	✓	✓	✓	✓	✓	✓	✓				✓		
	Classification of vegetation										✓	✓	✓			
Subjective		5	✓	✓						✓	✓	✓	✓	✓		
	Classification of vegetation										✓	✓	✓			
Quantitati		6	✓	✓	✓	✓	✓	✓						✓		
	Determination of degree of										✓	✓	✓			
Statistical		7, 8	✓	✓						✓				✓		
	Determination of degree of										✓	✓	✓			
Transect		9	✓	✓	✓	✓								✓	✓	✓
	Classification of vegetation											✓	✓			
Vegetation		10,	✓	✓						✓				✓	✓	✓
	Classification of vegetation										✓	✓	✓			
Causal		12	✓	✓	✓	✓	✓	✓	✓	✓						✓
	Revision										✓	✓	✓			
Round-up discussion		13	✓	✓						✓						✓
Thesis			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

5.2 Learning and Teaching Methods

Learing Method	Course outcomes ILOs													
	Knowledge and Understanding				Intellectual Skills			Professional and Practical Skills			General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	C1	C2	C3	D1	D2	D3	D4
Lecture	√	√	√	√	√	√	√							
Discussion (Brain Storming)														
Self-learing (Essay)														
Field Trips														
Practical								√	√	√			√	

5. 3. Assessment Methods

Assessment Methods	Course outcomes ILOs														
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills			General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4
Written final exam	√	√		√		√	√								
Practical									✓	✓	√	✓	✓	✓	√

Course coordinator: Prof. Kamal Hussein Shaltout

Head of Department: Prof. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Ecology

A- Basic Information

Course Title	Precise principles of flowering plant systematic, palynology and flora	
Course Code	**1514**	
Academic	**2014/2014**	
Coordinator	**Dr. Dalia Abd El-Azeem Abd El-Azeem Ahmed**	
Other Staff	-	
Pre-Requisite	**GC level Biology or its equivalent**	
Semester	**Part one: Precise principles of flowering plant systematic and Flora (one semesters).Part two: Palynology and its applications (one semester).**	
Course Delivery	**Lecture**	**Part one (14 x 1h lectures)**
	Practical	**Part one (14 x 2h practical)**
Parent	**Botany Department**	
Date of	**8, 2014**	

B- Professional Information

4. **course aims:**

Teach the students the historic development of taxonomy, basic systematic and evolutionary units of plant classification, concepts of species definition, and associated areas of plant diversity, speciation, ecotypic variation and Teach students the different forms of palynomorphs, particularly the palynomorphs of pollen grains, and its uses in studying plant taxonomy, evolution of plant vegetation and in economic geology.

2. **Intended learning outcomes of course (ILOs)**

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Identify the history of the development of the views of species.

A2. Recognize the basic and evolutionary unit of plant taxonomy

A2. Explain the pros and cons of the molecular and morphological classification

A3. Identify the different concepts of species; advantage and disadvantages

A4. Define the relation between ecotype variation and genetic diversity

A5. Explain the structure of pollen grains, its importance, its distribution in geological information and its uses in studying the plant evolution and in economic geology.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B1. Demonstrate the principles underlying plant classification, genetic change and evolution. .

B2. Select appropriate characters for plant classification.

B3. Illustrate the principles underlying using palynomorphs of pollen grains in plant taxonomy, vegetative analysis and economic geology.

B4. Compare between the molecular and morphological classification

B5. Critically evaluate the primary literature in particular areas of plant systematics

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-

C1. Examine the different forms of pollen grains.

C2. Use the microscope for examining the structure of pollen grains.

C3. Examine the morphological traits of plants.

C4. Collect plants from different populations of plant species and identify it.

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-

D1. Prepare a research proposal on a topic of the course

D2. Demonstrate written and verbal communication skills on modern approaches in plant classification and construction of phylogenetic trees

D3. Use the internet to prepare an essay on the topics of plant systematics and evolution

D4. Use databases and library search methods as well as internet sites

3. Contents

Week	Topic
	Part 1: Precise principles of flowering plant systematic and studying flora (an hour/week).
1	Introduction to methods of plant taxonomy.

2	Explain the different modern methods of plant taxonomy.
3	Identification of botanical garden and its importance.
4	Definition of herbarium, its role in plant taxonomy and its importance
5	How to construct herbarium?
6	Methods to keep specimens in Herbarium
7	Round-up discussion on the previous topics
8	How to use floral books in Identifications (accumulative key)
9	How to use floral books in Identifications (numerical key)
10	How to use floral books in Identifications of Gramineae
11	How to use floral books in Identifications of Compositae
12	How to use floral books in Identifications of Crucifereae
13	How to use floral books in Identifications of Leguminosea.
14	**Assesment**
	Part 2: Palynology and its application (an hour/week).
1	Introduction
2	Identify the mean of palynology.
3	Identification of pollens and how they are formed.
4	Chemical Composition of Spores and Pollen – importance of pollen grains
5	Types of pollination
6	Composition of pollen grains and Sporoderm (spore wall)
7	Simple and Compound apertures – Spores of Pteridophyta
8	Pollen Morphology and Taxonomy of Angiosperms
9	Fossil Palynology
10	Pollen analysis
11	Distribution and Evolution of spores and pollens
12	Microfossils and Geology
13	Pollen Germination in the Lab.
14	Pollen Preparation
	Practical Lessons
	Part 1: Precise principles of flowering plant systematic and studying flora (2 hours/week).
1	Prepartion of botanical herbarium
2	Family:Chenopodiaceae
3	Family:Cruciferae
4	Family: Leguminosae
5	Family: Compositae
6	Family: Gramineae
7	Aquatic weeds
8	Field weeds
9	Street weeds
10	Ornamental trees
11	Fruit trees
12	Crops and vegetables
13	Endemic plants
14	General revesion
	Part 2: Palynology and its application (2 hours/week).
1	How to collect pollens
2	Methods of pollens collections
3	Field work to collect pollen
4	Field work to collect pollen
5	Field work to collect pollen
6	Preparing pollen slide

7	Preparing pollen slide
8	Preparing pollen slide
9	How to examine the pollen slide
10	How to examine the pollen slide
11	Identify the pollen type
12	Identify the pollen type
13	Identify plant by pollen morphology
14	Revision

4. Teaching and learning methods

a. Lectures ☒
b. Practical training / laboratory ☒
c. Seminar / Workshop ☐
d. Class Activity -

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P,T
Semester work	to assess	-

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

Assessment schedule

Assessment 1	Practical exam	Week	After week 14
Assessment 2	Final exam	Week	After week 14

Weighing of assessments

Final-term Examination	60	%
Practical Examination	40	%
Semester work		%
Total	100	%

6. List of references

Course notes

Course notes and Laboratory manual authorized by the Council of Department of Botany.

Essential books (text books)

- Michael Simpson. Plant Systematic Academic Press (September 16, 2005)

- Chester A. Arnold . An Introduction To Paleobotany (Paperback - Mar 15, 2007).

Amazon.com

Recommended books

- Landscaping with Native Plants of Minnesota by Lynn M. Steiner (Paperback - Mar
- Michael Simpson, Plant Systematics .San Diego State University, California, U.S.A

Web sites

http://en.wikipedia.org/wiki/History_of_plant_systematics

http://www.plantsystematics.org/

http://www.sci.sdsu.edu/plants/plantsystematics/

http://www.ibiblio.org/botnet/glossary/vasc.html

http://www.flmnh.ufl.edu/paleobotany/

http://www.economicexpert.com/a/Paleobotany.htm

7. Facilities required for teaching and learning

Generic resources, such as the library.

Compound Microscope

Electronic copies of past exam papers and example assessments.

Computer Aided, such as E-mail, online conference, data show.

Digital camera for images collections as a tool for active learning.

Course coordinator:

Dr. Dalia Abd El-Azeem Abd El-Azeem Ahmed

Head of Department:

Prof. Alaa Abou-Zeid

Date: 8/2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1514, course title: Precise principles of flowering plant systematics, palynology and flora

Course Contents	Practical	Week	Knowledge and understanding					Intellectual					Practical				Tranferrable			
			A 1	A 2	A 3	A 4	A 5	B 1	B 2	B	B 4	B 5	C 1	C 2	C 3	C 4	D 1	D 2	D3	D4
Introduction to methods of plant taxonomy.		1	✓	✓		✓	✓	✓	✓			✓					✓	✓	✓	✓
	Prepartion of botanical herbarium															✓				
Explain the different modern methods of plant taxonomy.		2	✓	✓			✓	✓	✓			✓							✓	✓
	Identification of Family: Chenopodiaceae															✓				
Identification of botanical garden and its importan		3	✓	✓			✓					✓							✓	✓

ce.																				
	Identification of Family: Leguminosae														✓	✓				
Definition of herbarium, its role in plant taxonomy and its importance		4	✓	✓				✓	✓			✓							✓	✓
	Identification of Family: Compositae															✓				
How to construct herbarium?		5	✓	✓			✓	✓				✓						✓	✓	✓
	Identification of Family: Gramineae															✓	✓			
Methods to keep specimens in Herbarium		6	✓	✓			✓	✓		✓	✓	✓								✓
	Aquatic weeds												✓			✓				
How to use floral books in Identifications (accumulative key)		7	✓	✓				✓	✓	✓		✓							✓	✓

	Field weeds												✓	✓		✓				
How to use floral books in Identifications (numerical key)		8	✓	✓				✓	✓			✓							✓	✓
	Street weeds														✓	✓				
How to use floral books in Identifications of Gramineae		9	✓	✓				✓	✓			✓					✓	✓	✓	✓
	Ornamental trees														✓	✓				
How to use floral books in Identifications of Compositae		10					✓	✓			✓	✓						✓	✓	✓
	Fruit trees														✓	✓				
How to use floral books in Identifications of Cruciferae		11	✓			✓	✓		✓	✓							✓	✓	✓	✓
	Crops and vegetables												✓			✓				
How to use floral books in Identifications of		12	✓	✓	✓					✓	✓	✓					✓	✓	✓	✓

Leguminosea.																				
	Endemic plants												✓			✓				
Part 2: Palynology and its application (2 hours/week).																				
Introduction		1	✓	✓								✓					✓	✓	✓	✓
	How to collect pollens												✓		✓					
Identify the mean of palynology.		2	✓	✓			✓					✓							✓	✓
	Methods of pollens collections												✓	✓	✓					
Identification of pollens and how they are formed.		3	✓	✓			✓		✓	✓	✓	✓							✓	✓
	Field work to collect pollen												✓	✓	✓					
Chemical Composition of Spores and Pollen – importance of pollen grains		4	✓	✓			✓	✓	✓			✓							✓	✓
	Field work to collect pollen												✓	✓	✓					

Types of pollination		5	✓	✓			✓	✓	✓	✓		✓						✓	✓	✓
	Field work to collect pollen												✓	✓	✓					
Composition of pollen grains		6	✓	✓				✓	✓	✓		✓								✓
	Preparing pollen slide												✓	✓	✓					
Sporoderm (spore wall)		7	✓	✓			✓	✓	✓			✓							✓	✓
	Preparing pollen slide												✓	✓	✓					
Simple and Compound apertures – Spores of Pteridophyta		8	✓	✓				✓	✓	✓		✓							✓	✓
	Preparing pollen slide												✓	✓	✓					
Pollen Morphology and Taxonomy of Angiosperms		9		✓			✓	✓	✓			✓					✓	✓	✓	✓
	How to examine the pollen slide												✓	✓	✓					

Fossil Palynology		10					✓	✓			✓	✓						✓	✓	✓
	How to examine the pollen slide												✓	✓	✓					
Pollen analysis		11				✓	✓		✓	✓	✓						✓	✓	✓	✓
	Identify the pollen type												✓	✓	✓					
Distribution and Evolution of spores and pollens		12	✓	✓	✓					✓	✓	✓					✓	✓	✓	✓
	Identify the pollen type												✓	✓	✓					
Microfossils and Geology		13	✓	✓	✓			✓	✓	✓									✓	✓
	Identify plant by pollen morphology												✓	✓	✓					
Pollen Germination in the Lab.		14	✓				✓										✓	✓	✓	✓
	Revision												✓	✓	✓	✓				
Pollen Preparation																				
Assessment																				

5.2 Learning and Teaching Methods

Learing Method	Course outcomes ILOs																	
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4
Lecture	√	√	√	√	√	√	√	√	√	√								
Discussion (Brain Storming)																		
Self-learing (Essay)																		
Field Trips																		
Practical											√	√	√	√			√	

5. 3. Assessment Methods

Assessment Methods	Course outcomes ILOs																	
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4
Essay Question	√	√		√	√	√	√	√	√									
MCQ																		
Student Activity																		
Practical											√	√	√				√	

Course ordinator: Dr Dalia Abd El-Azeem Ahmed

Head of Botany Department: Dr Alaa Abou Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Ecology

A- Basic Information

Title: Principles of geology and geological screening	Code: 1513
Hours: 2	Lecture: 2
Tutorial:	Practical: --
Total:	
Coordinator	**Prof. Mahmoud Hussein Ashmawy**
Other Staff	**Pro.f Nader H. El Gendy**
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	Lectures:14 x 1h lectures Practical: 14 x 2h Sessions

-Academic Year : 2014-2015

B- Professional Information

Course aims:

Provide students with the basic principles of Geology, Enable students to read aerial photographs and Teach students how to observe and collect data and samples in the field.

2. **Intended learning outcomes of course (ILOs)**

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Identify types of land forms and their related processes.

A2. Recognize the necessary equipments required in field mapping.

A3. Discuss the visual interpretation of aerial photographs.

A4. Explain the different concepts of physical geology

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B1. Classify the landform types.

B2. Illustrate the visual interpretation of aerial photographs. B3. Demonstrate the different concepts of physical geology B4. Analyze the collected data from aerial photographs

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :- C1. Collect and Identify rock types C2. Describe the collected rocks. C3. Use topographic and geological maps in Geologic surveying. C4. Visual interpretation of Aerial photographs.

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :- D1. Use the internet/electronic resource. D2. Use PC to write and plot date. D3. Make use of IT. D4. Write a photo-interpretation report.

3. Contents

Week	Topic
1	Earth outer layer
2	Earth outer layer
3	Major structural unit
4	Major structural unit
5	Hydrologic system
6	Hydrologic system
7	Basic concept of physical geology
8	Basic concept of physical geology
9	Basic concept of physical geology
10	Geologic surveying
11	Geologic surveying
12	Aerology
13	Aerology
14	Aerology

4. Teaching and learning methods

a. Lectures ☒
b. Practical training / laboratory ☒
c. Seminar / Workshop ☐
d. Class Activity -

e. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P,T
Semester work	to assess	-

Assessment schedule

Assessment 1	Practical exam	Week	15
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	60	%
Practical Examination	40	%
Semester work	-	%
Total	100	%

f. List of references

Course notes

- Course notes and Laboratory manual authorized by the Council of Department of Botany

Essential books (text books)

- Basic concept of physical geology.
- Manual of field geology
- Remote sensing with special emphasis on photography.

Recommended books

- Earth dynamic systems.

Web sites

- International journal of remotes sensing.
- Egyptian journal of remote sensing and space sciences.

g. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computer Presentation and Writing Boards
- Microscopes; Compound microscope.
- Microscopic Anatomical Preparations.
- Live plant Morphological Samples
- Library

Course coordinator:

Prof. Mahmoud Hussein Ashmawy

Head of Department:

Prof. Alaa Abou-Zeid

Date: / 8 / 2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code:1513, course title: Principles of geology and geological screening

Course Contents	Weeks	Knowledge and understanding					Intellectual					Practical					Tranferrable				
		A 1	A 2	A 3	A 4	A 5	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	C 5	D 1	D 2	D 3	D 4	D 5
Earth outer layer	1	✓	✓	✓	✓																
Earth outer layer	2	✓	✓				✓								✓					✓	
Major structural unit	3	✓									✓	✓						✓	✓	✓	
Major structural unit	4	✓					✓	✓	✓					✓	✓		✓			✓	
Hydrologic system	5	✓	✓				✓	✓				✓	✓						✓	✓	
Hydrologic system	6			✓	✓						✓	✓			✓		✓			✓	
Basic concept of physical geology	7	✓	✓	✓	✓						✓	✓	✓	✓	✓				✓	✓	
Basic concept of physical geology	8	✓	✓	✓	✓		✓				✓				✓		✓	✓	✓	✓	
Basic concept of	9	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	

physical geology																					
Geologic surveying	10	✓	✓	✓	✓		✓										✓	✓	✓	✓	
Geologic surveying	11	✓					✓	✓	✓					✓	✓					✓	
Aerology	12	✓	✓	✓	✓		✓												✓	✓	
Aerology	13	✓	✓	✓	✓		✓	✓	✓	✓								✓	✓	✓	
Aerology	14	✓	✓							✓	✓	✓					✓	✓	✓	✓	
Assessment																					

Course coordinator: Prof. Mahmoud Hussein Ashmawy

Head of Botany Department: Prof. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Ecology

A- Basic Information

Course Title	**Climatology- Advanced studies on soil physics and soil chemistry-Plant Water relations**	
Course Code	**1512**	
Academic Year	**2014/2014**	
Coordinator	**Prof.** Ahmed Sharaf El-Din	
Other Staff	**Prof.** Kamal Shaltout, Prof Mohamed nabeih El-Shorbagy	
Pre-Requisite	**GC level Biology or its equivalent**	
Semester	**Part one:** General and micro-climatology **(one semesters).** **Part two:** Advanced studies on soil physics and soil chemistry **(two semester)** **Part three:** plant-water relation **(one semester)**	
Course Delivery	**Lecture**	**Part one (14 x 1h lectures)** **Part two: (28 x 1h lectures)** **Part three: (14 x1hlectures)**
	Practical	**Part one (14 x 2h practical)** **Part two (28 x 2h practical)** **Part three (14 x 2h practical)**
Parent	**Botany Department**	
Date of	**8, 2014**	

B- Professional Information

Course aims:

Teach students the soil as a vital component of the ecosystem, Apply statistical tests and multivariate analysis for evaluating plant populations and communities, Illustrate the link between the soil characters and the distribution of the plant populations and communities, Illustrate the effect of the climate on the abiotic (e.g. soil) and biotic (e.g. plants) components of the ecosystem, explain the soil-water relationships, explore the adaptive significance of metabolic responses to water deficits, and analysis of soil, climate and water characteristics in a certain habitat.

2. Intended learning outcomes of course (ILOs)

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Identify the soil, climate and water characteristics for evaluating their effects on plant populations and communities.

A2. Recognize the modern aspects of the soil, climate and water relation sciences and their applications

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-
B1. Analyze the soil, climate and water characteristics for evaluating their effects upon the plant populations and communities. .B2. Correlate studies of the atmosphere, weather and climate and their effect upon the vegetation. B3. Illustrate the recent principles and approaches for the study of plant soil and water relations.

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-
C1. Use suitable techniques for studying the physics and chemistry of the soil, climate and water relations. C2. Prepare suitable experimental field and lab designs on the subject of the course and to analyze the results statistically. C3. Design a filed experiment that correlates soil and water analyses, and climatology. C4. Describe the different methods of soil, climate and water-relation analyses and their use in biological research.

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-
D1. Prepare a research proposal on a topic of the course D2. Demonstrate written and verbal communication skills on modern approaches in the soil, climate and water-relation sciences. D3. Prepare an essay on the topics of the course and its application. D4. Use databases and library search methods as well as internet sites

3. Contents

Week	Topic
	Part one: General and micro-climatology (an hour/week)
1	Air Temperature
2	Atmospheric moisture and precipitation 1
3	Atmospheric moisture and precipitation 2
4	Light
5	Heat Budget of the earth's surface 1

6	Heat Budget of the earth's surface 2
7	Temperature relationships near the ground 1
8	Temperature relationships near the ground 2
9	Humidity relationships near the ground 1
10	Humidity relationships near the ground 2
11	Wind relationships near the ground 1
12	Wind relationships near the ground 2
13	Round-up discussion on the previous topics
14	Partial examination
	Part two: Advanced studies on soil physics and soil chemistry (An hour/week)
1	Introduction for soil definition
2	Composition and development of soil
3	Importance of Soil
4	Types of soil classification
5	Soil texture
6	Soil Structure
7	Soil porosity, air and water
8	Round-up discussion on the previous topics
9	Partial examination
10	Soil living organisms
11	Soil erosion
12	Soil conservation
13	Management of soil physical properties
14	Soil solution
15	Soil acidity and alkalinity
16	Soil inorganic compounds
17	Round-up discussion
18	Partial examination
19	Composition and transformation of organic matter 1
20	Composition and transformation of organic matter 2
21	Electronic properties of soil 1
22	Electronic properties of soil
23	Properties of soil colloids
24	Soil cartography
25	Importance of soil cartography
26	Round-up discussion on the previous topics
27	Partial examination
28	Assessement
	Part three: plant-water relation
1	Introduction for plant water relation
2	Definition of Drought and its reasons
3	Drought and Origin of Adaptation to Water-Stress
4	Low and high soil-water potentials
5	Osmo regulation in higher plants
6	Water stress in higher plants
7	Water transport and relationship to growth processes
8	Metabolic responses of plants to water deficits
9	Cell-level metabolic responses
10	Effects of water deficits on metabolism 1
11	Effects of water deficits on metabolism 2
12	Adaptive significance of metabolic responses to water deficits.
13	Round-up discussion on the previous topics
14	Assessement

	Practical Lessons **Part one: General and micro-climatology (2hours/week)**
Lab.1	Introduction of climatology
Lab. 2	Demonstration of the instruments of climatological factors(temperature)
Lab. 3	Demonstration of the instruments of climatological factors (moisture)
Lab. 4	Demonstration of the instruments of climatological factors (wind)
Lab. 5	Demonstration of the instruments of climatological factors (atmospheric
Lab. 6	Demonstration of the instruments of climatological factors (Rains)
Lab. 7	Identification of climatologically stations and affectivity of rainfall**1**
Lab. 8	Identification of climatologically stations and affectivity of rainfall**2**
Lab. 9	Visit to Tanta climatologically station 1.
Lab. 10	Visit to Tanta climatologically station 2.
Lab. 11	Round-up discussion on the previous labs.
Lab. 12	Revision
Lab. 13	Examination
	Part two: Advanced studies on soil physics and soil chemistry (2 hours/week)
Lab. 1	Measurement of water flow in soil by capillarity 1
Lab. 2	Measurement of water flow in soil by capillarity 2
Lab. 3	Determination of soil moisture contents 1
Lab. 4	Determination of soil moisture contents 2
Lab. 5	Determination of apparent density, real density and porosity of soil 1
Lab. 6	Determination of apparent density, real density and porosity of soil 2
Lab. 7	Assessment of mechanical analysis of soil 1
Lab. 8	Assessment of mechanical analysis of soil 2
Lab. 9	Determination of organic matter **1**
Lab. 10	Determination of organic matter **2**
Lab. 11	Preparation of soil extract (Soil solution)
Lab. 12	Determination of Hydrogen ion activity **1**
Lab. 13	Determination of Hydrogen ion activity **2**
Lab. 14	Determination of total soluble salts (EC) **1**
Lab. 15	Determination of total soluble salts (EC) **2**
Lab. 16	Determination of soluble chlorides (Cl^-) **1**
Lab. 17	Determination of soluble chlorides (Cl^-) **2**
Lab. 18	Determination of soluble carbonates (CO_3^{--}) and bicarbonates (HCO_3^-) **1**
Lab. 19	Determination of soluble carbonates (CO_3^{--}) and bicarbonates (HCO_3^-) **2**
Lab. 20	Revision
Lab. 21	Practical exam

4. Teaching and learning methods

2. Lectures ☒
3. Practical training / laboratory ☒
4. Seminar / Workshop ☐
5. Class Activity -

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P,T
Semester work	to assess	-

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

Assessment schedule

Assessment 1	Practical exam	Week	After week 14 and 28
Assessment 2	Final exam	Week	After week 28

Weighing of assessments

Final-term Examination	60	%
Practical Examination	40	%
Semester work	-	%
Total	100	%

6. List of references

Course notes

Course notes and Laboratory manual authorized by the Council of Department of Botany

Essential books (text books)

- Zonn, S. V. 1986. Tropical and Subtropical Soil. Mir Publishers, Moscow.
- Barry, R. G. and Chorley, R. J. 1972. Atmosphere, Weather and Climate. Butler & Tanner Ltd, London.

Recommended books

- Slavik, B. 1974. Methods of studying plant water relations. Publishing Home of the Czechoslovake Academy of Sciences.
- Stoutjesdijk, Ph. And Barkman, J. J. 1987. Microclimate, Vegetation and Fauna. Opulus Press AB, Knivsta.

Web sites

http://www.rothamsted.bbsrc.ac.uk/notebook/courses/guide/

http://www.ncbi.nlm.nih.gov/

http://us.expasy.org/

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computer Presentations and Writing Boards
- Library

Course coordinator:

Prof. Ahmed Sharaf El-Din

Head of Department:

Prof. Alaa Abou-Zeid

Date: 8 / 2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1512, course title: Climatology- Advanced study of soil physics and Soil chemistry-Plant Water relations

Course Contents	Practical Lessons	Weeks	Knowledge and understanding		Intellectual			Practical				Tranferrable			
Part one: General and micro-climatology (an hour/week)			A1	A2	B 1	B 2	B 3	C 1	C 2	C 3	C 4	D 1	D 2	D 3	D 4
Air Temperature		1	✓	✓	✓									✓	
	Introduction of climatology								✓						
Atmospheric moisture and precipitation 1,2		2,3					✓					✓	✓	✓	✓
	Demonstration of the instruments of climatological factors(temperature)								✓	✓					
Light		4			✓	✓	✓					✓	✓	✓	✓
	Demonstration of the instruments of climatological factors (moisture)								✓	✓					
Heat Budget of the earth's surface 1,2		5,6			✓	✓						✓	✓	✓	✓
	Demonstration of the instruments of climatological factors (wind)								✓	✓					
Temperature relationships near the ground		7,8	✓	✓	✓								✓		
	Demonstration of the instruments of climatological factors (atmospheric pressure)								✓	✓					
Humidity relationships near the		9,10	✓	✓	✓								✓		

ground 1,2															
	Demonstration of the instruments of climatological factors (Rains)								✓	✓					
Wind relationships near the ground. 1,2		11,12					✓					✓	✓	✓	✓
	Identification of climatologically stations and affectivity of rainfall**1, 2**								✓	✓	✓				
	Visit to Tanta climatologically station **1,2**								✓	✓	✓				
Part two: Advanced studies on soil physics and soil chemistry (An hour/week)															
Introduction for soil definition		1		✓	✓	✓									
	Measurement of water flow in soil by capillarity 1										✓	✓			
Composition and development of soil				✓	✓	✓									
	Measurement of water flow in soil by capillarity 2										✓	✓			
Importance Soil				✓	✓	✓	✓								
	Determination of soil moisture contents 1								✓	✓		✓			
Types of soil classification				✓	✓	✓	✓					✓	✓	✓	✓
	Determination of soil moisture contents 2								✓	✓		✓			
Soil texture				✓	✓	✓	✓					✓	✓	✓	✓
	Determination of apparent density, real density and porosity of soil 1								✓	✓	✓	✓			
Soil Structure				✓	✓	✓	✓					✓	✓	✓	✓
	Determination of apparent density, real density and porosity of soil 2								✓	✓	✓	✓			
Soil porosity, air and water				✓	✓	✓	✓					✓	✓	✓	✓

	Determination of apparent density, real density and porosity of soil								✓	✓	✓	✓			
Round-up discussion on the previous topics															
Partial examination															
Soil living organisms				✓	✓	✓	✓					✓	✓	✓	✓
	Assessment of mechanical analysis of soil 1							✓	✓	✓	✓				
Soil erosion				✓	✓							✓			✓
	Assessment of mechanical analysis of soil 2							✓	✓	✓	✓				
Soil conservation				✓	✓							✓			✓
	Determination of organic matter **1**							✓	✓	✓	✓				
Management of soil physical properties			✓	✓	✓	✓	✓					✓			✓
	Determination of organic matter **2**							✓	✓	✓	✓				
Soil solution					✓	✓	✓					✓			✓
	Preparation of soil extract (Soil solution)							✓	✓	✓	✓				
soil acidity and alkalinity					✓	✓	✓					✓			✓
	Determination of Hydrogen ion activity **1**							✓	✓	✓	✓				
Soil inorganic compounds					✓								✓	✓	✓
	Determination of Hydrogen ion activity **2**							✓	✓	✓	✓				
Round-up discussion															
Partial examination															
Composition and transformation of organic matter 1, 2			✓	✓	✓	✓	✓					✓			
	Determination of total soluble salts (EC) **1**							✓			✓				

Electronic properties of soil 1,2				✓	✓							✓	✓	✓	✓
	Determination of total soluble salts (EC) **1**							✓			✓				
Properties of soil colloids				✓	✓	✓	✓					✓	✓	✓	✓
	Determination of soluble chlorides (Cl^-) **1**							✓			✓				
Soil cartography				✓	✓	✓		✓	✓	✓					
	Determination of soluble chlorides (Cl^-) **1**							✓			✓				
Importance of soil cartography			✓	✓	✓							✓	✓		✓
	Determination of soluble carbonates (CO_3^{--}) and bicarbonates (HCO_3^-) **1**							✓			✓				
Round-up discussion on the previous topics			✓	✓	✓	✓	✓								
	Determination of soluble carbonates (CO_3^{--}) and bicarbonates (HCO_3^-) **1**							✓			✓				
Part three: plant-water relation															
Introduction for plant water relation		1			✓	✓	✓								✓
Definition of Drought and its reasons		2			✓	✓	✓								✓
Drought and Origin of Adaptation to Water-Stress		3			✓	✓	✓								✓
Low and high soil-water potentials		4					✓					✓			✓
Osmo regulation in higher plants		5			✓	✓						✓	✓	✓	✓
Water		6			✓	✓						✓	✓	✓	✓

stress in higher plants															
Water transport and relationship to growth processes		7			✓								✓	✓	✓
Metabolic responses of plants to water deficits		8			✓	✓	✓								✓
Cell-level metabolic responses		9			✓	✓	✓					✓	✓	✓	✓
Effects of water deficits on metabolism 1,2		10, 11													
Adaptive significance of metabolic responses to water deficits.		12			✓		✓					✓	✓		✓
Round-up discussion on the previous topics		13										✓			✓
Assessment		14													

5.2 Learning and Teaching Methods

Learing Method	**Course outcomes ILOs**												
	Knowledge and Understanding		**Intellectual Skills**			**Professional and Practical Skills**				**General and Transferable Skills**			
	A1	**A2**	**B1**	**B2**	**B3**	**C1**	**C2**	**C3**	**C4**	**D1**	**D2**	**D3**	**D4**
Lecture	√	√	√	√	√								
Discussion (Brain Storming)													
Self-learing (Essay)													
Field Trips													
Practical						√	√	√	√			√	

5. 3. Assessment Methods

Assessment Methods	Course outcomes ILOs												
	Knowledge and Understanding		Intellectual Skills			Professional and Practical Skills				General and Transferable Skills			
	A1	A2	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3	D4
Essay Question	√	√	√	√	√								
MCQ													
Student Activity													
Practical						√	√	√	√		√		

Course coordinator: Prof. Ahmed Sharaf El-Din

Head of Botany Department: Prof. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Ecology

A- Basic Information

Course Title	**Climatology- Advanced studies on soil physics and soil chemistry-Plant Water relations**	
Course Code	**1518**	
Academic Year	**2014/2014**	
Coordinator	**Prof.** Kamal Shaltout	
Other Staff		
Pre-Requisite	**GC level Biology or its equivalent**	
Semester	**Two semester**	
Course Delivery	**Lecture**	**14 x 1h lectures**
	Practical	**14 x 2h practical**
Parent Department	**Botany Department**	
Date of Approval	**8, 2014**	

B- Professional Information

Course aims:

Achieve a comprehensible form of the too much data that characterize the modern biological research, apply statistical tests for evaluating differences, variations and associations between populations and their significance in probability terms, teach the students the modern software programs for statistical analysis of a set of observations obtained from a population in the pubsequent literature and find out the best possible experimental design that provides the best sorting out of the controlled and uncontrolled variations.

2. Intended learning outcomes of course (ILOs)

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Identify the role of the biostatistics in the procedure of the biological scientific research.

A2. Recognize the association between variables in normal and abnormal distributed populations (correlations and regressions).

A3. Compare between each pair of treatments in multi-treatment experiments

A4. Explain the tests of significance of the difference between two or more than two sampled populations.

A5. Discuss the application, advantages and disadvantages of the different types of experimental designs.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B1. Differentiate between the characteristics of the different types of distributions B2. Demonstrate the principles and approaches underlying current methods of biostatistics and its application using computer software programs B3. Apply the best suitable statistical tests for the different biological experiments B4. Perform suitable experimental designs. B5. Analyze the results statistically.

c- Professional skills

By the end of the M. Sc. course the graduate must be able to :- C1. Perform the best suitable statistical tests for the different biological experiments C2. Provide the statistical consultation for the students and researchers of biology. C3. Prepare the suitable experimental design and to analyze the results statistically

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :- D1. Use databases and library search methods as well as internet sites D2. Independent learning ability required for continuing professional development D3. Work with others, use and manage ideas and information . D4. Demonstrate written and verbal communication skills on modern approaches

3. Contents

Week	Topic
1	Introduction about Biostatistics as a tool of scientific research
2	Sampling of attributes
3	Frequency and probability distributions
4	Normal distribution
5	Binomial distribution
6	Frequency and probability distributions
7	Normal distribution and Binomial distribution
8	Poisson distribution
9	Tests of significance
10	Round-up discussion on the previous topics
11	Partial examination

12	Introductory note on analysis of variance
13	Data transformations, One-way analysis of variance
14	Some basic experimental designs (completely random, randomized complete block and Latin square designs)
15	Two-way analysis of variance
16	Split-plot experimental design Split-plot experimental design
17	Least significant difference (LSD)
28	Least significant range (LSR) tests
29	Simple linear regression
20	Simple linear regression
21	Rank correlation
22	Curve fitting
23	method of least squares
24	Multiple correlation, regression and analysis of time series
25	Multiple regression
26	Analysis of time series
27	Round up discussion on the previous topics
28	Round up discussion on the previous topics

4. Teaching and learning methods

a. Lectures ☒
b. Practical training / laboratory ☒
c. Seminar / Workshop ☐
d. Class Activity -

e. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P
Semester work	to assess	-

*KU: Knowledge and Understanding, I: Intellectual, P: Professional, T: Transferable

Assessment schedule

Assessment 1	Practical exam	Week	After week 28
Assessment 2	Final exam	Week	After week 28

Weighing of assessments

Final-term Examination	60	%
Practical Examination	40	%
Semester work	-	%
Total	100	%

f. List of references

Course notes

Essential books (text books)

Zar, J. H. 1984. Biostatistical Analysis: Second Edition. Prentice Hall, Inc., New Jersy, USA

Snedecor, G. W. & Cochran, W. G. 1967. Satistical Methods. The Iowa State University Press, Iowa, USA.

Zar, J. H. 1984. Biostatistical Analysis: Second Edition. Prentice Hall, Inc., New Jersy, USA

Snedecor, G. W. & Cochran, W. G. 1967. Satistical Methods. The Iowa State University Press, Iowa, USA.

Recommended books

Voelkl, K. E. & Gerber, S. B. 1999. ***Using SPSS for Windows: Data Analysis and Graphics*.** Springer, New York, USA.

Stephens, L. J. 1998. ***Beginning Statistics***. Schaum's Outline Series, McGraw-Hill. New York, USA.

Web sites

www.google.com
http://www.accessexcellence.org/RC/genetics.htm
www.researchnavigator.com

g. Facilities required for teaching and learning

- Generic resources, such as the library.

- Electronic copies of past exam papers and example assessments. - Computer Aided, such as E-mail, online conference, data show. - Course web page, Digital camera for images collections as a tool for active learning

Course coordinator: Prof. Kamal Shaltout

Head of Department: Prof. Alaa Abou-Zeid

Date: / 8 / 2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1518, course title: Biostatistics

Course Contents	Weeks	Knowledge and understanding					Intellectual					Professional skills			Tranferrable			
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4
Introduction about	1	✓	✓				✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
Sampling of attributes	2	✓	✓									✓	✓	✓		✓	✓	✓
Frequency and probability distributions	3	✓	✓				✓	✓	✓									✓
Normal distribution	4	✓	✓				✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
Binomial distribution	5				✓	✓	✓							✓		✓	✓	✓
Frequency and probability distributions	6	✓	✓				✓	✓	✓			✓	✓	✓		✓	✓	✓
Normal distribution and Binomial distribution	7	✓	✓			✓	✓	✓				✓	✓	✓	✓			
Poisson distribution	8	✓	✓			✓	✓	✓				✓	✓	✓			✓	✓
Tests of significance	9						✓	✓	✓			✓					✓	✓
Round-up discussion on the previous topics	10	✓	✓		✓	✓	✓					✓	✓	✓	✓	✓	✓	✓
Partial examination	11	✓							✓			✓	✓	✓	✓	✓	✓	✓
Introductory note on analysis of variance	12	✓	✓		✓	✓	✓								✓			✓
Data transformations, One-way analysis of variance	13								✓			✓	✓	✓	✓	✓	✓	✓
Some basic experimental designs	14	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Two-way analysis of variance	15	✓	✓				✓	✓	✓									✓
Split-plot experimental design Split-plot experimental design	16	✓					✓					✓	✓	✓	✓	✓	✓	✓
Least significant difference (LSD)	17	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
Least significant	18	✓	✓				✓					✓	✓	✓	✓			

range (LSR) tests																		
Simple linear regression	19			✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
Simple linear regression	20	✓	✓											✓	✓			✓
Rank correlation	21	✓	✓				✓	✓	✓			✓	✓	✓	✓			✓
Curve fitting	22	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
method of least squares	23	✓	✓				✓	✓	✓									✓
Multiple correlation	24	✓	✓				✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
Multiple regression	25	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓		✓
Analysis of time series	26	✓	✓				✓	✓	✓			✓	✓	✓	✓			✓
Discussion around up	27	✓	✓				✓	✓	✓			✓	✓	✓	✓			✓
Assessment	28	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓				

Course coordinator: Pro. Kamal Shaltout

Head of Botany Department: Prof. Alaa Abou-Zeid

Department offering the programme	Botany Department
Department offering the course	Mathematics
Academic year / Level	2014-2015, first term
Date of specification approval	08/2014

A- Basic Information

Title: Computer	Code: 1517
Tutorial:	
Total:	
Coordinator	**Prof. Mohamed El-Awady**
Other Staff	**Prof. Mahmoud Kamel, Prof. Ahmed El-Shishtawy, Prof. Qadry Zakaria**
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	**Lecture: 28 x 1h lectures** **Practical: 28 x 1h practical**

B- Professional Information

3. **course aims:**

Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies. Underpin academic work throughout postgraduate studies. Provide opportunities to develop skills required for team working, oral presentations of scientific material, and career choices.

2. **Intended learning outcomes of course (ILOs)**

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A4. Recognize the diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.

A5. Arrange powerful presentation using sophisticated software packages.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B8. Integrate different application programs to develop effective information analysis and presentation.

B9. Solve scientific problems using computer programming.

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-   C1. Use a number of computer packages to present information.   C2. Perform necessary graphical, statistical and frequency analyses of different types of data.   C3. Use of different internet resources.   C4. Use of different photo enhancing and manipulation techniques.

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-   D6. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

4. Contents

Lectures 1-2	Methods for graphical representations, Data analysis and Data modeling **Assignment 1** : **Using Application programs** Calculation of Slope and intersection of lines , Best fitting for data, Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)
Lectures 3-5	Statistical Data analysis **Assignment 2** : **Using Application programs** Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data
Lecture 6-7	Creating powerful presentation including charts, images, video, etc and different attractive animations **Assignment 3** : **Using PowerPoint program** Design a real and powerful presentation with different acquired skills
Lecture 8-9	Use of internet capabilities and searching engines **Assignment 4: Using the Internet** Life search on the internet for some real information
Lecture 10-11	Creating Data Base and related Queries and Reports **Assignment 5: Using Application programs** Creating a real Data Base and apply different queries and reports to extract useful information
Lecture 12-13	Computer programming language

	Assignment 6: Programming using Visual Basic 6
	Solving real problems using a computer language
Lecture 14-15	Photo manipulation and enhancement using the photoshop
	Assignment 7: **Using the Photoshop program**
	Practicing on manipulation and enhancing of images
Lectures 16	Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities

5. Teaching and learning methods

a. Lectures ☒
b. Practical training / laboratory ☒
c. Seminar / Workshop ☐
d. Class Activity -

e. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P
Semster work	to assess	-

Assessment schedule

Assessment 1	Practical exam	Week	
Assessment 2	Final exam	Week	

Weighing of assessments

Final-term Examination	60	%
Practical Examination	40	%
Semester work	-	%
Total	100	%

f. List of references

Course notes

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

g. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

Course coordinator:

Prof. Mohamed El-Awady

Head of Department:

Prof. Alaa Abou-Zeid

Date: / 8 / 2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1517, course title: Computer

Course Contents	W	Knowledge and understanding					Intellectual					Practical					Tranferrable				
		A 1	A 2	A 3	A 4	A 5	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	C 5	D 1	D 2	D 3	D 4	D 5
Methods for graphical representations	1	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Assignment 1 : Using Application programs	2	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Statistical Data analysis	3	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Assignment 2 : Using Application programs	4	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Creating powerful presentation	5	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Assignment 3 : Using PowerPoint program	6	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Use of internet capabilities and searching engines	7	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Assignment 4: Using the Internet	8	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Creating Data Base and related Queries	9	✓	✓				✓	✓				✓	✓	✓	✓		✓				

and Reports																					
Assignment 5: Using Application programs	10	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Computer programming language	11	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Assignment 6	12	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Photo manipulation and enhancement using the photoshop	13	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Assignment 7: Using the Photoshop program	14	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Introduction to Data frequency analysis	15	✓	✓				✓	✓				✓	✓	✓	✓		✓				
Assessment																					

Learning and Teaching Methods

Learing Method		Course outcomes ILOs																	
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Lecture	√	√	√	√	√		√	√		√										
Discussion (Brain Storming)																				
Self-learing (Essay)																				
Field Trips																				
Practical											√	√	√	√	√					

Assessment Methods

Assessment Methods		Course outcomes ILOs																		
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√	√	√		√													
MCQ																				
Student Activity																				
Practical											√		√		√					
Assessment Methods																				

Course coordinator: Prof. Mohamed El-Awady

Head of Botany Department: Prof. Alaa Abou-Zeid

M.Sc. Program Of Physiology

A. Program Specification

Program Title	**Master of Physiology**
Award	**Master of Physiology**
Parent Department	**Botany Department**
Teaching Institution	**Faculty of Science - TU**
Awarding Institution	**Tanta University**
Coordinator	**Wedad Kasem**
External Evaluator(s)	**This system has not applied yet**
QAA Benchmarking Standards	**National Academic Reference Standards (NARS)**
Other Reference Points	**Bioscience, Egyptian Code of Assessment**
Date of Delivery	**Every year in September**
Review Date	**Internal Periodic Review, Summer 2014**
Date of Approval	**8, 2014**

Academic Year : 2014-2015

Aims

To understand main aspects of water relations and manometric methods, learn modern physiological techniques, provide intense hands-on training in molecular biology techniques, explore theory and practice of plant metabolism and enzymology, improve theoretical and practical fundaments of advanced biochemistry techniques and the physiology of micro-organisms.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should have acquired knowledge and understanding of the underlying concepts and principles of:

A21. Advanced equipments and chromatographic separation.

A22. Advanced biochemistry and organic acids metabolism.

A23. Physiology of microorganisms and update readings and studies.

A24. Ion absorption and permeability, and water relations and stomata.

A25. Manometric methods in metabolism and nitrogen assimilation.

B. Intellectual skills:

At the end of this module students should have acquired the ability to:

B1. Think logically and organize tasks into a structured form.

B2. Assimilate knowledge and ideas based on wide reading and through the internet.

B3. Understand the evolving state of knowledge in a rapidly developing field.

B4. Construct and test hypothesis.

B5. Plan, conduct and write a report on an independent research project.

C. Professional and practical skills

There is no Practical Skills

D. General and transferable skills:

D40. Work in a team and be able to cooperate with others.

D41. Demonstrate written and verbal communication skills using IT in work and in life.

D42. Have knowledge of accounting and management.

D43. Ability to manage time and resources.

D44. Present ideas and arguments in a structured manner.

E. Teaching and learning

Knowledge will be developed through

1. Lectures.

F. Assessment

A wide variety of assessment methods are used

1. Written exam.

3. Academic standards

Academic Reference Standards: The Academic Reference Standards (ARS) for MSc. program degree in Botany as well as the attributes and capabilities of the graduates were based on the General Academic Reference Standards (ARS) for graduate studies published by the National Authority for Quality Assurance and Accreditation of Education (2009) for M.Sc. Degree. Specific reference standard for the M.Sc. in botany were approved by the Council of the Faculty of Science, Tanta University in 2014.

3.A External references for standards (Benchmarks):

In order to fulfill international standards, our students should acquire:

I. Knowledge and Understanding:

Approaches to study and forms of subject knowledge likely to be common to all bioscience degree programs will include the following:

- knowledge and understanding the processes and mechanisms of Plant Functions and Life:
- From molecular to cellular.
- From Organism to community.
- Engagement with the essential facts, major concepts, principles and theories associated with the chosen discipline.

- Understanding of information and data, and their setting within a theoretical framework.
- familiarity with the:
- Terminology.
- Nomenclature.
- Classification systems as appropriate.
- Methods of acquiring, interpreting and analysing biological. information with a critical understanding of the appropriate contexts for their use through the:
- Study of texts.
- Original papers.
- Reports and data sets.
- Developing knowledge about the diversity of life and its evolution.
- Knowledge of a range of practical techniques and methodologies, including :
- Data analysis.
- Engagement with current developments in the biosciences and their applications, and the philosophical and ethical issues involved.
- The applicability of the biosciences to the careers to which graduates will be progressing.

II. Skills

A. Generic skills

- an appreciation of the complexity and diversity of life processes through the study of organisms, their molecular, cellular and physiological processes, their genetics and evolution, and the interrelationships between them and their environment.
- the ability to read and use appropriate literature with a full and critical understanding.
- the capacity to give a clear and accurate account of a subject.
- critical and analytical skills: a recognition that statements. should be tested and that evidence is subject to assessment and critical evaluation.
- the ability to employ a variety of methods of study in investigating, recording and analyzing material.
- the ability to think independent, set tasks and solve problems.

B. Key skills

The specific key skills that should be developed in bioscience degree courses are subdivided into:-

1. Intellectual skills

- Recognizing and applying subject-specific theories, concepts or principles. For example:
    - The relationship between life and Plant Physiology.
    - The nature of essential nutrients in microbes, cells, plants and animals;
- Analyzing and summarizing information critically, including published research or reports;
- Obtaining and integrating several lines of subject-specific evidence to formulate and test hypotheses;
- Applying subject knowledge and understanding to address familiar and unfamiliar problems

    organisms under investigation.

    - other stakeholders.

2. Interpersonal and teamwork skills

- Identifying individual and collective goals and responsibilities and performing in a manner appropriate to these roles;
- Recognizing and respecting the views and opinions of other team members;
- Negotiating skills;
- Evaluating performance as an individual and a team member; evaluating the performance of others;
- Developing an appreciation of the interdisciplinary nature of science and of the validity of different points of view.

3. Self-management and professional development skills

- Developing the skills necessary for self-managed and lifelong learning (e.g. working independent, time management and organization skills);
- Identifying and working towards targets for personal, academic and career development;
- Developing an adaptable, flexible, and effective approach to study and work.

3.B-Comparison of provision to external references:

International Academic Standards (NARS)

4. Curriculum Structure and contents:

Level 1	Obligatory Four Courses						Program ILOs Covered
Code	Course Title	Term 1		Term 2		Cred.	
		Thr	Pract	Thr	Prac		
	Advanced Equipments and Chromatographic Separation.	1	-	1	-	2	
	Advanced Biochemistry and Organic Acids Metabolism.	1	-	1	-	2	
	Physiology of Microorganisms and Free Readings.	1	-	1	-	2	
	Ion Absorption and Permeability, and Water Relations and Stomata.	1	-	1	-	2	
	Manometric Methods in Metabolism and Nitrogen Assimilation.	1	-	1	-	2	
	German Language						
	Computer						

Brief Description of Courses for the M.Sc. in Physiology

A- Courses

1-Uses of Instrumental Equipment & Chromatography

First part: Instrumental Equipment

- Concepts of instrumental analyis (analytical approach, defining, statistics and data handeling)
- Sample preparation and performing the measurement.
- IR Spectroscopy (Absorption And Instrumentation)
- Sampling techniques and analytical application)
- Visible and ultraviolet molecular spectroscopy (introduction, Instrumentation0
- UV absorption, Spectra and the structure of organic molecule)
- UV analytical application, accuracy and precision in UV/ VIS
- Nephlometry and turbidimetry, molecular emission
- UV instrumentation and analytical application
- Flame emission and atomic absorption spectroscopy (emission and asorption, atomization and ionization)

- Flames, burners and nebulizers, nonflame automization
- Radiation sources and optical system, Flame spectra and interferences
- Quantitative analysis and Typical applications.
- Atomic absorption spectrometry(Absorption of radiant energy, Instrumentation)

Second part: Chromatography

- Introduction (Definition and application)
- Theoretical concepts.
- Polarity and different solvent system of TLC.
- Adsorption thin-layer different adsorbant, developers and visualizing agents.
- Partition thin layer.
- TLC on microscopic slides and larger layer.
- Preparation methods of TLC.
- Quantitative TLC.
- Preparation of TLC.
- Column adsorption chromatography.
- Column partition.
- Choice of a system GLC and bases for separation.
- Identification of components in a mixture.
- Quantitative analysis of a mixture.
-

2- Advanced biochemistry AND Metabolism

First Part: Advanced biochemistry

- Chlorophyll pigments: types, distribution, biosynthesis and function
- Carotenoid pigments: types, distribution, biosynthesis and function
- Phycobiliproteins: types, distribution, biosynthesis and function
- Structure and properties of ATP
- Types of phosphorylation in green cells
- Substrate level phosphorylation
- Oxidative phosphorylation
- Photosynthetic phosphorylation
- Mechanism of phosphorylation
- Biological function of energy rich compounds.
- The chemical coupling hypothesis
- The conformational coupling hypothesis
- The chemiosmosis coupling hypothesis
- Selected papers on the topics of the course

Second Part: Metabolism

- Introduction on carbon metabolism in plants
- Organic acids in C3 plants
- Organic acids in C3 plants

- Crassulacean acid metabolism
- Organic acids in C4 plants
- Organic acids and cellular respiration
- Malate aspartate shuttle
- Other pathways of carbohydrate metabolism
- Mitochonderial and peroxisomal oxidation of fatty acids
- Mitochonderial and peroxisomal oxidation of fatty acids
- Role of organic acids in the signal transduction pathways
- Role of organic acids in stress detoxification strategy
- Discussion of some selected papers on the course topics
- Discussion of some selected papers on the course topics
-

3- Physiology of Fungi and different studies

First part: Free Reading

- Discussions on the topics of the course
- Distribution of assignments of basic molecular genetics
- Control of gene expression
- The genetics of flowering plant
- Tissue specific gene expression
- Gene cloning protocols
- Gene transfer methods
- Applications of recombinant DNA
- Methods of gene transfer
- Breeding for drought resistance
- Mutations and genome shuffling
- Introduction to molecular markers
- Types of molecular markers
- Applications of molecular markers
- Presentation of assignments

Part 2: Physiology of Fungi

- Introduction about the fungi stress protein
- Heat shock protein (hsp)
- Heat shock protein as Chaperons (hsp 70, hsp80 and hsp 60)
- Heat shock protein: proteases (hsp 100 and ubiquitin)
- Heat shock protein with unknown fuctions (including α-Crystallin-related proteins and other heat shock proteins)
- Heat shock protein: Glycolysis and respiration
- Heat shock protein: Oxidative damage
- Open Discussion
- Heat shock transcription factors
- Cellular effects of Heat shock protein
- Respiration and energy generation and splicing of mRNA precursors

- Heat shock protein and development (differentiation)
- Heat shock protein and trehalose accumulation
- Open discussion about the previous topics
- Assessments

4- Water relation and mineral nutrition

- Physiology (1) Botany
- Structure of water molecule
- Physical and chemical characterizes water
- Potentials controlling water movement through the plants
- Diffusion and forces controlling it
- Osmosis and osmoregulation capacities and demand
- Osmosis equations and plant state
- Permeability
- Identification of plant nutrients
- Nutrient absorption factors and interaction
- Nutrients translocation controlling factors
- Factors affecting nutrients balances
- Nutrients deficiency and plant activity
- Ion stress and plant growth
- Overall revision

5. Programme admission requirements

Arrangements for admission are based on the national guidelines with no Faculty control on the number of newly enrolled students.

Candidates must satisfy the general admission requirements of the University, Faculty in Biology and also hold one of the following:

- General Certificate of Secondary Education (GCSE) in Biology
- GCSE in Biology at grade C or higher.
- International Baccalaureate (GCSE, American Diploma)?

6. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression through the programmes in which they are enrolled.

- To progress from year one to year two or year two to year three or year three to year four, student need to pass in all course units with a maximum of fail in two.

- Student who fails their final examination at the first attempt will be eligible only for a “Pass” degree following any re-set examinations.

 Progression from level one to level two:

In order to progress from Level One to Level Two, a student shall normally achieve a threshold performance at part Level One. To gain a threshold

		Knowledge and Understanding	Intellectual skills	Professional skills	General skills

performance at Level One, a student shall normally be required to pass in all course units with a maximum of fail in two.

Progression from ‘Level Two’ to ‘Level Three:’

To gain a threshold performance in ‘Level Two’, a student shall normally be required to achieve an aggregate score determined annually by the faculty council, and to pass in all course units. In order to pass from ‘Level Two’ to Part three, a student shall normally be required to achieve a threshold performance at ‘Level Two’ and to pass in all course units with a maximum of fail in two.

To pass the Summer Training, students must achieve a non-scored threshold training level base on submission of a formal written non-scored report from the training institution and the supervisor. Students who fail the summer training will (not) be required to transfer to the four year programme.

To obtain the degree at the end of the ‘Level Four’, student must pass in all course units and achieve at least an overall of 60%.

7. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Not applied yet	
2. Alumni	Not applied yet	
3. Stakeholde Employers)	Not applied yet	
4. External Evaluator(s)(External Examiner(s))	Not applied yet	

Name	Signature	Date
Programme Coordinator:	Dr.Wedad Kasem …….……..………..………	8/2014

		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5
Advanced Equipments and Chromatographic Separation.	1521	√	√	√	√		√	√	√		√					√	√	√	√	√
Advanced Biochemistry and Organic Acids Metabolism.	1522	√	√	√	√		√	√	√	√	√							√		√
Physiology of Microorganisms and Free Readings.	1523	√			√	√	√			√						√	√		√	√
Ion Absorption and Permeability, and Water Relations and Stomata.	1524	√	√	√	√	√		√	√	√	√					√	√	√	√	√
Manometric Methods in Metabolism and Nitrogen Assimilation.	1525	√	√		√	√	√	√										√		
Computer	1527		√	√	√	√			√	√										

Tanta University, Faculty of Science

M. Sc. Course specifications of Plant Physiology

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014-2015, Two terms
Date of specification approval	8/ 2014

A- Basic Information

Title: Uses of Instrumental Equipments & Chromatography	Code: 1521
	Lecture: 2
Tutorial:	Practical: --
Total:	
Coordinator	Dr. El-Sayed Abd El-Latef Foda
Other Staff	Dr. Samha Mohamed Abdel Monem Dwoidar
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	14 x 1h lectures (first term) 14 x 1h lectures (second term)

B- Professional Information

Course aims:

Teach students the principles and concepts of essential topics of instrumental analysis.Provide students with the knowledge and skills of chromatographic methods including methods of sampling, sample handling and sample preparation from plant materials for analysis.

2-Intended learning outcomes of course (ILOs)

a- Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A.1- Describe the different types and function of instrumental equipment and

chromatography. A.2- Illustrate chromatographic different applied methods for separation of the samples.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :- B1- Compare between the different use of instrumental equipments and chromatographic techniques. B2- Numerate different adsorbents, developers, visualizing agents and different chromatographic techniques. B3- Apply the modern quantitative analysis and typical applications

c- Professional and practical skills : There's no practical skills

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :- D1. Acquire, analyze, synthesize, summarize and present information and ideas from a wide range of sources• D2. Communicate effectively by written, spoken and graphical means using appropriate techniques D3. Work effectively with a range of types of information technology D4. Work alone or with others to achieve an objective

3. Contents

Instrumental Equipment	
Week	**Topic**
1	Concepts of instrumental analysis (analytical approach, defining, statistics and data handling)
2	Sample preparation and performing the measurement.
3	IR Spectroscopy (Absorption And Instrumentation)
4	Sampling techniques and analytical application)
5	Visible and ultraviolet molecular spectroscopy (introduction, Instrumentation0
6	UV absorption, Spectra and the structure of organic molecule)
7	UV analytical application, accuracy and precision in UV/ VIS

8	Nephlometry and turbidimetry, molecular emission
9	UV instrumentation and analytical application
10	Flame emission and atomic absorption spectroscopy (emission and asorption, atomization and ionization)
11	Flames, burners and nebulizers, nonflame automization
12	Radiation sources and optical system, Flame spectra and interferences
13	Quantitative analysis and Typical applications.
14	Atomic absorption spectrometry(Absorption of radiant energy, Instrumentation
Chromatography	
Week	**Topic**
1	Introduction (Definition and application)
2	Theoretical concepts.
3	Polarity and different solvent system of TLC.
4	Adsorption thin-layer different adsorbant, developers and visualizing agents.
5	Partition thin layer.
6	TLC on microscopic slides and larger layer.
7	Preparation methods of TLC.
8	Quantitative TLC.
9	Preparation of TLC.
10	Column adsorption chromatography.
11	Column partition.
12	Choice of a system GLC and bases for separation.
13	Identification of components in a mixture.
14	Quantitative analysis of a mixture.
15	Introduction (Definition and application)

7. Teaching and learning methods

. Lectures ☒

a. Practical training / laboratory ☐
b. Seminar / Workshop ☐
c. Class Activity -

8. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	-

Assessment schedule

Assessment 1	Practical exam	Week	-
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	100	%
Practical Examination	-	%
Total	100	%

9. List of references

Course notes

Course notes: Lecturer note

Essential books (text books)

Recommended books

Web sites

http://en.wikipedia.org/wiki/History_of_plant_systematics http://www.plantsystematics.org/

10. Facilities required for teaching and learning

Electronic copies of past exam papers and example assessments. Generic resources, such as the library. Computer Aided, such as E-mail, online conference, data show. Course web page, Digital camera for images collections as a tool for active learning.
Course coordinator: Dr. El-Sayed Abd El-Latef Foda
Head of Department: Prof. Dr. Alaa Abou-Zeid

Tanta University, Faculty of Science **Course Contents – Course ILOs Matrix** **Course code: 1521, course title: Uses of Instrumental Equipments & Chromatography**													
Course Contents	**Week s**	**Course outcomes ILOs**											
		Knowledge and nderstandin g		**Intellectual**			**Practical**			**Tranferrable**			
Instrumental Equipment		A1	A2	B 1	B 2	B 3	C 1	C 2	C 3	D 1	D 2	D 3	D 4
Concepts of instrumental analysis (analytical approach, defining, statistics and data handling)	1	✓	✓										
Sample preparation and performing the measurement.	2	✓	✓	✓	✓	✓				✓	✓	✓	✓
IR Spectroscopy (Absorption And Instrumentation)	3			✓	✓	✓				✓	✓		✓
Sampling techniques and analytical application)	4			✓	✓	✓				✓	✓		✓
Visible and ultraviolet molecular spectroscopy (introduction, Instrumentation 0	5			✓									✓

UV absorption, Spectra and the structure of organic molecule)	5	✓	✓	✓								✓	
UV analytical application, accuracy and precision in UV/ VIS	6				✓							✓	
Nephlometry and turbidimetry, molecular emission	7				✓					✓	✓	✓	
UV instrumentation and analytical application	7				✓								
Flame emission and atomic absorption spectroscopy (emission and asorption, atomization and ionization)	8	✓	✓		✓							✓	✓
Flames, burners and nebulizers, nonflame automization	8		✓									✓	✓
Radiation sources and optical system, Flame spectra and interferences	9	✓	✓			✓					✓	✓	✓
Quantitative analysis and Typical	10	✓										✓	✓

applications.													
Atomic absorption spectrometry(Absorption of radiant energy, Instrumentation	11	✓	✓			✓	✓						
Concepts of instrumental analysis (analytical approach, defining, statistics and data handling)	12					✓	✓						
Sample preparation and performing the measurement.	13			✓	✓	✓	✓			✓	✓	✓	✓
IR Spectroscopy (Absorption And Instrumentation)	14			✓	✓	✓					✓	✓	✓
Chromatography		✓	✓	✓	✓	✓					✓	✓	✓
Introduction (Definition and application)	1	✓	✓	✓	✓	✓					✓	✓	✓
Theoretical concepts.	2	✓	✓	✓	✓	✓					✓	✓	✓
Polarity and different solvent system of TLC.	3		✓	✓									✓
Adsorption thin-layer different adsorbant, developers and visualizing agents.	4		✓										✓

Partition thin layer.	5		✓	✓	✓	✓							✓
TLC on microscopic slides and larger layer.	6		✓	✓	✓							✓	✓
Preparation methods of TLC.	7		✓	✓	✓								✓
Quantitative TLC.	8												✓
Preparation of TLC.	9	✓								✓		✓	✓
Column adsorption chromatography.	10	✓								✓		✓	✓
Column partition.	11	✓	✓	✓	✓	✓				✓		✓	✓
Choice of a system GLC and bases for separation.	12	✓	✓	✓	✓					✓	✓	✓	✓
Identification of components in a mixture.	12				✓	✓							
Quantitative analysis of a mixture.	14	✓								✓			✓
Introduction (Definition and application)	15	✓		✓							✓	✓	✓
thesis		✓	✓	✓	✓	✓	✓		✓	✓			

5.2- Learning and Teaching Methods

Learing Method	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Lecture	√	√	√	√	√		√		√											
Discussion (Brain Storming)																				
Self-learing (Essay)																				
Field Trips																				
Practical																				

5.3- Assessment Methods

Assessment Methods	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√			√			√	√										
MCQ																				
Student Activity																				
Practical											✓	✓	✓	✓	✓	✓	✓	✓	✓	

Course coordinator: Dr.El-Sayed Abd El-Latef Foda

Head of Department: Prof. Dr. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Plant Physiology

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014-2015, Two terms
Date of specification approval	2014

A- Basic Information

Title: **Advanced biochemistry** and organic acids metabolism	Code: 1522
	Lecture: 2
Tutorial:	Practical: --
Total:	
Coordinator	Prof. Dr. Awatif Ali Mohsen
Other Staff	Prof.Dr. M. El-Anwar H. Osman
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	14 x 1h lectures (first term) 14 x 1h lectures (second term)

B- Professional Information

course aims:

Understanding the biosynthetic pathways of photosynthetic pigments and their role in photosynthesis . Teaching the students the concept and mechanism of phosphorylation in plant cells. Understanding the concept of carbon metabolism in the different compartments of the plant cells. Teaching the students the role of organic acids in the detoxification strategy against biotic and abiotic stresses.

2- Intended learning outcomes of course (ILOs)

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Identify the different types, distribution and function of all

photosynthetic pigments in plants A2. Explain the concept of phosphorylation and energy production A3. Define the different mechanisms of phosphorylation leading to energy rich compounds. A4. Demonstrate the different pathways of organic acid metabolism in the plant cell

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :- B1. Illustrate the interrelationship of the metabolic pathways via organic acids conversion in plant cells. B2. Analyze phosphorylation mechanisms pathways in plants. B3. Demonstrate the mechanisms of energy production in photosynthetic organisms. B4. Apply the modern technologies like stress protein, DNA sequence and gene transfer in gene manipulation as a strategy of stress detoxification and tolerance in plants

c- Professional and practical skills

There is no practical skills

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :- D1. Prepare a research proposal on a topic of the course. D2. Use the internet to prepare an essay on the topics of metabolic pathways in the plant cell. D3. Use databases, library search and internet sites.

3. Contents

Advanced Biochemistry	
Week	**Topic**
1	Chlorophyll pigments: types, distribution, biosynthesis and function
2	Carotenoid pigments: types, distribution, biosynthesis and function
3	Phycobiliproteins: types, distribution, biosynthesis and function

4	Structure and properties of ATP
5	Types of phosphorylation in green cells
6	Substrate level phosphorylation
7	Oxidative phosphorylation
8	Photosynthetic phosphorylation
9	Mechanism of phosphorylation
10	Biological function of energy rich compounds.
11	The chemical coupling hypothesis
12	The conformational coupling hypothesis
13	The chemiosmosis coupling hypothesis
14	Selected papers on the topics of the course

organic acids metabolism	
Week	**Topic**
1	Introduction on carbon metabolism in plants
2	Organic acids in C3 plants
3	Organic acids in C3 plants
4	Crassulacean acid metabolism
5	Organic acids in C4 plants
6	Organic acids and cellular respiration
7	Malate aspartate shuttle
8	Other pathways of carbohydrate metabolism
9	Mitochonderial and peroxisomal oxidation of fatty acids
10	Mitochonderial and peroxisomal oxidation of fatty acids
11	Role of organic acids in the signal transduction pathways
12	Role of organic acids in stress detoxification strategy
13	Discussion of some selected papers on the course topics
14	Discussion of some selected papers on the course topics

4. Teaching and learning methods

- Lectures ☒
- Discussion ☒
- Self learning ☒
- Practical training / laboratory ☐
- Seminar / Workshop ☐
- Class Activity ☐

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	-

Assessment schedule

Assessment 1	Practical exam	Week	-
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	100	%
Practical Examination		%
Total	100	%

6. List of references

Course notes

Essential books (text books)

Recommended books

Web sites

http://www.oxfordjournals.org.,
http://www.colby.edu/info.tech/BI211/Families.html

http://www.cedarville.edu/academics/sciencemath/silvius/3520/352sites.htm

Internets sites of publishers of science books and periodicals, e.g. Springer Verlag, Academic press, Oxford, John Wiley and sons. .etc….

7. Facilities required for teaching and learning

- Generic resources, such as the library.
- Electronic copies of past exam papers and example assessments.
- Computer Aided, such as E-mail, online conference, data show.
- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

Prof. Dr. Awatif Ali Mohsen

Head of Department:

Prof. Dr. Alaa Abou-Zeid

Date: / 8 / 2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1522, course title: Advanced biochemistry

Course Contents	Weeks	Course outcomes ILOs														
		Knowledge and nderstanding				Intellectual				Practical				Tranferrable		
Advanced Biochemistry		A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4					D 1	D 2	D 3
Chlorophyll pigments: types, distribution, biosynthesis and function	1	✓													✓	✓
Carotenoid pigments: types, distribution, biosynthesis and function	2	✓													✓	
Phycobiliproteins: types, distribution, biosynthesis and function	3	✓													✓	
Structure and properties of ATP	4					✓	✓	✓							✓	
Types of phosphorylation in green cells	5	✓	✓											✓	✓	✓
Substrate level phosphorylation	5	✓	✓	✓	✓	✓	✓	✓	✓							✓

Oxidative phosphorylation	6	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
Photosynthetic phosphorylation	7	✓	✓	✓	✓				✓					✓	✓	✓
Mechanism of phosphorylation	7	✓	✓	✓										✓	✓	✓
Biological function of energy rich compounds.	8	✓	✓	✓	✓	✓	✓	✓	✓						✓	✓
The chemical coupling hypothesis	8	✓	✓				✓	✓	✓						✓	✓
The conformational coupling hypothesis	9	✓	✓	✓	✓	✓	✓	✓							✓	✓
The chemiosmosis coupling hypothesis	10					✓	✓		✓						✓	
Selected papers on the topics of the course	11	✓	✓	✓					✓						✓	
Chlorophyll pigments: types, distribution, biosynthesis and function	12	✓	✓	✓	✓	✓	✓		✓						✓	
Carotenoid pigments: types, distribution, biosynthesis and function	13	✓	✓												✓	
Phycobiliproteins: types, distribution, biosynthesis and	14	✓	✓	✓	✓	✓	✓		✓						✓	✓

function																
organic acids metabolism																
Introduction on carbon metabolism in plants	1	✓	✓	✓	✓	✓	✓							✓	✓	✓
Organic acids in C3 plants	2	✓				✓	✓							✓		✓
Organic acids in C3 plants	3	✓	✓	✓	✓	✓	✓							✓		✓
Crassulacean acid metabolism	4	✓	✓											✓		✓
Organic acids in C4 plants	5	✓	✓	✓	✓	✓	✓							✓	✓	✓
Organic acids and cellular respiration	6	✓												✓	✓	✓
Malate aspartate shuttle	7	✓													✓	✓
Other pathways of carbohydrate metabolism	8															
Mitochonderial and peroxisomal oxidation of fatty acids	9	✓														
Mitochonderial and peroxisomal oxidation of fatty acids	10	✓													✓	✓
Role of organic acids in the signal transduction	11	✓														✓

pathways																
Role of organic acids in stress detoxification strategy	12	✓	✓	✓	✓											✓
Discussion of some selected papers on the course topics	12	✓												✓	✓	✓
Discussion of some selected papers on the course topics	14	✓	✓	✓				✓	✓							✓
Assessment	16															

5.2- Learning and Teaching Methods

Learing Method	**Course outcomes ILOs**																			
	Knowledge and Understanding					**Intellectual Skills**					**Professional and Practical Skills**					**General and Transferable Skills**				
	A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**C1**	**C2**	**C3**	**C4**	**C5**	**D1**	**D2**	**D3**	**D4**	**D5**
Lecture	√	√	√	√	√		√		√							√	√		√	
Discussion (Brain Storming)	√	√	√		√		√		√	√						√			√	√
Self-learing (Essay)	√	√		√		√		√								√	√			
Field Trips																				
Practical																				

5.3- Assessment Methods

Assessment Methods	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√			√			√	√										
MCQ																				
Student Activity																				
Practical																				

Course coordinator: Prof.Dr. Awatif Ali Mohsen

Head of Department: Prof. Dr. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Plant Physiology

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014-2015, Two terms
Date of specification approval	2014

A- Basic Information

Title: **Physiology of microorganisms and Free reading**	Code: 1523
	Lecture: 2
Tutorial:	Practical: --
Total:	
Coordinator	Prof. Dr. .Metwaly Abdel-Azeem
Other Staff	Prof. Dr. Essam El-Deen Mohamed Abo-Kassem
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	14 x 1h lectures (first term) 14 x 1h lectures (second term)

B- Professional Information

course aims:

Provide students with the fundamental principles of heat stress and spore dormancy in fungi as two important physiological criteria. Give the students an opportunity to explore different new subjects to be updated within their science areas.

2. **Intended learning outcomes of course (ILOs)**

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Identify the strategies used by fungi to overcome the heat stress.

A2. Define the different types of proteins and other growth factors that contribute to

overcoming heat stress. A3. Explain some consequences of fungi spores differentiation after dormancy.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :- B1. Illustrate the principles, underlying physiology of fungi in response to different growth conditions especially heat. B2. Evaluate the metabolic response of fungi to environmental stress in a manner that may recognize unknown metabolites or physiological process.

c- Professional and practical skills

There's no practical skills

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :- D1. Gain both written and verbal skills about microbial physiology. D2. Use databases and library search methods

3. Contents

Free reading	
Week	**Topic**
1	Discussions on the topics of the course
2	Distribution of assignments of basic molecular genetics
3	Control of gene expression
4	The genetics of flowering plant
5	Tissue specific gene expression
6	Gene cloning protocols
7	Gene transfer methods
8	Applications of recombinant DNA
9	Methods of gene transfer
10	Breeding for drought resistance

11	Mutations and genome shuffling
12	Introduction to molecular markers
13	Types of molecular markers
14	Applications of molecular markers
15	Presentation of assignments

Physiology of microorganisms

Week	Topic
1	Introduction about the fungi stress protein
2	Heat shock protein (hsp)
3	Heat shock protein as Chaperons (hsp 70, hsp80 and hsp 60)
4	Heat shock protein: proteases (hsp 100 and ubiquitin)
5	Heat shock protein with unknown fuctions (including α-Crystallin-related proteins and other heat shock proteins)
6	Heat shock protein: Glycolysis and respiration
7	Heat shock protein: Oxidative damage
8	Open Discussion
9	Heat shock transcription factors
10	Cellular effects of Heat shock protein
11	Respiration and energy generation and splicing of mRNA precursors
12	Heat shock protein and development (differentiation)
13	Heat shock protein and trehalose accumulation
14	Open discussion about the previous topics
15	Assessments

4. Teaching and learning methods

a. Lectures	☒
b. Discussion	☒
c. Self learning	☒
d. Practical training / laboratory	☐

e. Seminar / Workshop	☐
f. Class Activity	-

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	

Assessment schedule

Assessment 1	Practical exam	Week	
Assessment 2	Final exam	Week	16

Weighting of assessments

Final-term Examination	100	%
Practical Examination		%
Total	100	%

6. List of references

Course notes

Essential books (text books)

Kempken and Kempken (2006) Gentechnik bei Pflanzen, Springer Verlag

Fungi Physiology by David H.Griffin, Second edition, Wiley-Liss A John Wiley & Sons, Inc., Publication, New York (1994)

Recommended books

Sites of publishers of science books and periodicals, e.g.. Springer Verlag, Academic press, Oxford John Wiley and sons. .etc….

Web sites

http://www. google.com

http://www.emc.maricopa.edu/faculty/farabee/biobk/BioBookDNAMOLGEN.html

http://www.learn4good.com/bookstore/genetics_books_cds_for_academic_students.htm

7. Facilities required for teaching and learning

Generic resources, such as the library.

Electronic copies of past exam papers and example assessments.

Computer Aided, such as E-mail, online conference, data show.

Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

Prof. Dr. .Metwaly Abdel-Azeem Prof. Dr. Essam El-Deen Mohamed

Head of Department: Prof. Dr. Alaa Abou-Zeid

Prof. Dr. Alaa Abou-Zeid

Date: / 8 / 2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code:1523, course title: : Physiology of microorganisms and Free reading

Course Contents	Weeks	Course outcomes ILOs							
		Knowledge and nderstanding			Intellectual		Practical	Tranferrable	
Free reading		A1	A2	A3	B1	B2		D1	D2
Discussions on the topics of the course	1	✓	✓	✓	✓	✓		✓	✓
Distribution of assignments of basic molecular genetics	2	✓	✓					✓	✓
Control of gene expression	3	✓	✓			✓			
The genetics of flowering plant	4	✓	✓						
Tissue specific gene expression	5	✓	✓	✓	✓	✓		✓	✓
Gene cloning protocols	5	✓				✓		✓	✓
Gene transfer methods	6							✓	✓
Applications of recombinant DNA	7					✓		✓	✓
Methods of gene transfer	7	✓	✓	✓	✓	✓		✓	✓
Breeding for drought resistance	8	✓	✓	✓	✓	✓		✓	✓
Mutations and genome shuffling	8	✓	✓					✓	✓
Introduction to molecular markers	9	✓	✓					✓	✓
Types of molecular markers	10	✓	✓	✓	✓	✓		✓	✓

Applications of molecular markers	11	✓				✓		✓	✓
Presentation of assignments	12	✓				✓		✓	✓
Discussions on the topics of the course	13	✓	✓	✓	✓	✓		✓	✓
Distribution of assignments of basic molecular genetics	14	✓	✓	✓	✓	✓		✓	✓
Control of gene expression	15	✓	✓	✓	✓	✓		✓	✓
Physiology of Microorganisms								✓	
Introduction about the fungi stress protein	1	✓	✓	✓		✓		✓	✓
Heat shock protein (hsp)	2	✓				✓		✓	✓
Heat shock protein as Chaperons (hsp 70, hsp80 and hsp 60)	3	✓	✓	✓		✓			✓
Heat shock protein: proteases (hsp 100 and ubiquitin)	4	✓				✓		✓	✓
Heat shock protein with unknown fuctions (including α-Crystallin-related proteins and other heat shock proteins)	5	✓	✓		✓	✓		✓	✓
Heat shock protein: Glycolysis and respiration	6	✓	✓		✓	✓		✓	✓

Heat shock protein: Oxidative damage	7	✓	✓	✓	✓	✓		✓	✓
Open Discussion	8	✓	✓	✓	✓	✓		✓	✓
Heat shock transcription factors	9	✓	✓			✓			✓
Cellular effects of Heat shock protein	10	✓	✓			✓		✓	✓
Respiration and energy generation and splicing of mRNA precursors	11	✓	✓			✓		✓	✓
Heat shock protein and development (differentiation)	12	✓	✓			✓		✓	✓
Heat shock protein and trehalose accumulation	13	✓	✓			✓		✓	✓
Open discussion about the previous topics	14	✓				✓		✓	✓
Assessment	15								

5.2- Learning and Teaching Methods

Learing Method	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Lecture	√	√	√	√	√		√		√							√	√		√	
Discussion (Brain Storming)	√	√	√		√		√		√	√						√			√	√
Self-learing (Essay)	√	√		√		√		√								√	√			
Field Trips																				
Practical																				

5.3- Assessment Methods

Assessment Methods	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√			√			√	√										
MCQ																				
Student Activity																				
Practical																				

Course coordinator:

Prof. Dr. .Metwaly Abdel-Azeem   Prof. r. Essam El-Deen Mohamed

Head of Department: Prof. Dr. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Plant Physiology

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014-2015, first term
Date of specification approval	2014

A- Basic Information

Title: **Ion absorption transport, water relations and stomata**	Code:1524
	Lecture: 2
Tutorial	Practical: --
Total:	
Coordinator	Prof. Mahmoud Abou Elyazeed Abd Elhaak
Other Staff	Prof. Mohamed Nabih El-Shourbagy
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	14 x 1h lectures (first term) 14 x 1h lectures (second term)

B- Professional Information

Course aims:

Teach the students the relationship between plant water relation and mineral nutrition . Explore the recent fundamental principles of plant water relationships.

2. **Intended learning outcomes of course (ILOs)**

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Recognize the forces that control water movement.
A2. Identify the relationship between osmosis and plant nutrients.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B1. Discriminate between solution as free and in the cell suspension and their

effect by mineral salts B2. Demonstrate the capacities of osmosis and osmoregulation B3. Analyze the factors controlling nutrients translocation B4. Critically evaluate literature in water relations.

c- Professional and practical skills

There's no practical skills

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :- D1. Use the internet D2. Prepare a research plan (proposal) D3. Gain both written and oral communication skills. D4. Use databases and library search methods

3. Contents

Water relations and stomata	
Week	**Topic**
1	Structure of water molecule
2	Physical and chemical characterizes water
3	Potentials controlling water movement through the plants
4	Diffusion and forces controlling it
5	Osmosis and osmoregulation capacities and demand
6	Osmosis equations and plant state
7	Part two: **Ion absorption oermiability**
8	Permeability
9	Identification of plant nutrients
10	Nutrient absorption factors and interaction
11	Nutrients translocation controlling factors
12	Factors affecting nutrients balances
13	Nutrients deficiency and plant activity
14	Ion stress and plant growth
15	Assessment

4. Teaching and learning methods

a. Lectures ☒
b. Practical training / laboratory ☐
c. Seminar / Workshop ☐
d. Class Activity -

5. Student assessment methods

Written final exam	to assess	Ku, I
Practical	to assess	

Assessment schedule

Assessment 1	Practical exam	Week	
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	100	%
Practical Examination		%
Total	100	%

6. List of references

Course notes

Initially, students are provided with a limited number of references relating to their subject area, but then are expected to search the literature on their own.

Essential books (text books)

Recommended books

Kramer, A. 1989: Plant water relationships, Blckwell letd.

Kirszner, L. G. and Mandell, S. R. The pocket handbook for biology.. Ed. Michael Rosenberg. Thomson Corporation, USA, 2004.

Web sites

http://www.google.com
http://www.eulc.edu.eg/v2/libraries/
www.thomsonrights.com

7. Facilities required for teaching and learning

Generic resources, such as the library.

Electronic copies of past exam papers and example assessments.

Computer Aided, such as E-mail, online conference, data show.

Course web page, Digital camera for images collections as a tool for active learning.

Course coordinator:

Prof. Mahmoud Abou Elyazeed Abd Elhaak

Head of Department:

Prof. Dr. Alaa Abou-Zeid

Date: / 8 / 2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1524, course title: Ion absorption transport, water relations and stomata

Course Contents	Weeks	Course outcomes ILOs															
		Knowledge and nderstanding		Intellectual				Practical				Tranferrable					
Water relations and stomata		A1	A2	B 1	B 2	B 3	B 4	C 1	C 2	C 3	C 4	D 1	D 2	D 3	D 4
Structure of water molecule	1	✓	✓	✓	✓	✓	✓					✓	✓	✓	✓
Physical and chemical characterizes water	2	✓	✓	✓	✓	✓	✓					✓	✓	✓	✓
Potentials controlling water movement through the plants	3	✓												✓	✓
Diffusion and forces controlling it	4	✓												✓	✓
Osmosis and osmoregulation capacities and demand	5	✓												✓	✓
Osmosis equations and plant state	5	✓												✓	✓
Part two: **Ion absorption oermiability**	6	✓										✓			✓
Permeability	7	✓	✓	✓	✓	✓									✓
Identification of plant nutrients	7				✓	✓	✓					✓	✓	✓	✓
Nutrient absorption factors and	8	✓	✓	✓	✓	✓	✓						✓	✓	✓

interaction															
Nutrients translocation controlling factors	8	✓	✓											✓	✓
Factors affecting nutrients balances	9	✓	✓	✓	✓	✓	✓						✓	✓	✓
Nutrients deficiency and plant activity	10		✓	✓	✓	✓	✓						✓		✓
Ion stress and plant growth	11		✓	✓									✓		✓
Structure of water molecule	12		✓	✓	✓	✓	✓						✓	✓	✓
Physical and chemical characterize s water	13	✓					✓								✓
Potentials controlling water movement through the plants	14	✓	✓				✓					✓		✓	✓
Assessment	15														

5.2- Learning and Teaching Methods

Learing Method	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Lecture	√	√	√	√	√		√		√							√	√		√	
Discussion (Brain Storming)	√	√	√		√		√		√	√						√			√	√
Self-learing (Essay)	√	√		√		√		√								√	√			
Field Trips																				
Practical																				

5.3- Assessment Methods

Assessment Methods	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√			√			√	√										
MCQ																				
Student Activity																				
Practical																				

Course coordinator: Prof. Dr. Mahmoud A. Abd Elhaak

Head of Department: Prof. Dr. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of plant Physiology

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014-2015
Date of specification approval	2014

A- Basic Information

Title: **Manometric Methods in Metabolism and Nitrogen Metabolism**	Code: 1525
	Lecture: 2
Tutorial:	Practical: --
Total:	
Coordinator	Prof. Dr.El Sayed Ahmed Morsey Hamada
Other Staff	Prof.Dr. Wedad Abd Elaziz Kasim
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	14 x 1h lectures (first term) 14 x 1h lectures (second term)

B- Professional Information

course aims:

To understand the essential topics and use of manometric methods in metabolism.Teach students the principles and concepts of nitrogen metabolism including catabolism, anabolism, manometers, nitrogen fixation, protein structure and function.

2. Intended learning outcomes of course (ILOs)

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-
A1. Recognize the current knowledge of metabolism (catabolism& anabolism)and manometers.
A2. Identify how metabolism and manometery are applied to elucidate the mechanisms underlying complex cellular and organismal processes.
A3. Recognize some detail to the exciting and expanding fields associated with plant structure and function.
A4 Identify the basics of manometery in plant structure, function and metabolism.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-	
B1.	Apply the knowledge they have in using manometric methods in metabolism research
B2.	Assess the merits of contrasting theories and explanations in nitrogen metabolism
B3.	Evaluate evidence and make critical judgments
B4.	Develop a reasoned argument

c- Professional and practical skills

There is no practical skills

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-
D1. acquire, analyze, synthesize, summaries and present information and ideas from a wide range of sources•
D2. communicate effectively by written, spoken and graphical means using appropriate techniques
D3. work effectively with a range of types of information technology
D4. work alone or with others to achieve an objective

3. Contents

Manometric Methods in Metabolism	
Week	**Topic**
1	Information flow metabolism.
2	Information flow in catabolism (respiration) and the rate of respiration under different conditions.
3	Types of respiration and respiratory quotient (RQ).
4	Principle of manometric methods.
5	Application of manometric methods and types of respirometers.
6	Ganong´s respirometer and measuring of the used oxygen during respiration.
7	Measuring the evolved CO_2 using Ganong´s respirometer.
8	Anabolism (photosynthesis) and rate of photosynthesis.
9	Evolution of oxygen during photosynthesis.
10	Types of Barcroft-Warburg manometer.
11	Using Warburg manometer in measuring consumed O_2 during respiration
12	Using Warburg manometer in measuring O_2evolution during photosynthesis.
13	Research methods in manometry.
14	Research methods in manometry.
Nitrogen Metabolism	
Week	**Topic**
1	Nitrogen fixation
2	Symbiotic nitrogen fixation

3	Non symbiotic nitrogen fixation
4	Mechanism of nitrogen fixation
5	Absorption of nitrogen by plants and the nitrate reduction
6	Inorganic nitrogen
7	Organic nitrogen (amino acid, amides, amines, nitrogen bases and nucleotides)
8	Protein structure and function
9	Functional classification of proteins: 1-regulation and transport,
10	2- storage proteins,
11	3- movement and protective proteins,
12	5- structural proteins,
13	6- catalytic proteins
14	Research methods in nitrogen metabolism.
15	Nitrogen fixation

4. Teaching and learning methods

a. Lectures ☒
b. Practical training / laboratory ☐
c. Seminar / Workshop ☐
d. Class Activity -

5. Student assessment methods

Written final exam	to assess	Ku,I
Practical	to assess	

Assessment schedule

Assessment 1	Practical exam	Week	
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	100	%
Practical Examination		%
Total	100	%

6. Course notes

Organic and Biological Chemistry (Hardcover)
by John R. Holm. Publisher: John Wiley and Sons, Inc. New York, Chichester, Brisbane, Toronto, Singapore (1996)
Plant Biochemistry (Hardcover)
By James Bonner and Joseph E. Varner: Academic Press New York. San Francisco. London. (1976) 3rd edition.
Plant Physiological Ecology (Hardcover)
Hans Lambers, F. Stuart Chapin III and Thijs L. Pons: Springer- Verlag New York Inc. (1998)

Essential books (text books)

Organic and Biological Chemistry (Hardcover)
by John R. Holm. Publisher: John Wiley and Sons, Inc. New York, Chichester, Brisbane, Toronto, Singapore (1996)
Plant Biochemistry (Hardcover)
By James Bonner and Joseph E. Varner: Academic Press New York. San Francisco. London. (1976) 3rd edition.
Plant Physiological Ecology (Hardcover)
Hans Lambers, F. Stuart Chapin III and Thijs L. Pons: Springer- Verlag New York Inc. (1998)

Recommended books

Molecular Biology of the Cell (Hardcover)
Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter. Publisher: Garland Science; 5 edition

Web sites

http://wikipedia
http://www.rothamsted.bbsrc.ac.uk/notebook/courses/guide/
http://www.ncbi.nlm.nih.gov/
http://us.expasy.org/

7. Facilities required for teaching and learning

- Generic resources, such as the library.
- Computer Presentations and Writing Boards
- Ganong's and Warburg manometers.
- Data show or LCD.

Course coordinator:

Prof. El Sayed Ahmed Morsey Hamada

Head of Department:

Prof. Dr. Alaa Abou-Zeid

Date: / 8 / 2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code:1525, course title: Manometric Methods in Metabolism and Nitrogen Metabolism

Course Contents	Course outcomes ILOs															
	Knowledge and Nderstanding					Intellectual				Practical			Tranferrable			
Manometric Methods in Metabolism		A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	C 1	C 2	C 3	D 1	D 2	D 3	D 4
Information flow metabolism.	1	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
Information flow in catabolism (respiration) and the rate of respiration under different conditions.	2	✓	✓	✓	✓	✓									✓	✓
Types of respiration and respiratory quotient (RQ).	3				✓	✓	✓	✓								✓
Principle of manometric methods.	4				✓	✓	✓	✓								✓

Application of manometric methods and types of respirometers.	5	✓	✓	✓	✓											✓
Ganong´s respirometer and measuring of the used oxygen during respiration.	5	✓	✓	✓	✓								✓	✓	✓	✓
Measuring the evolved CO_2 using Ganong´s respirometer.	6	✓	✓	✓	✓								✓			✓
Anabolism (photosynthesis) and rate of photosynthesis.	7	✓											✓	✓	✓	✓
Evolution of oxygen during photosynthesis.	7	✓													✓	✓
Types of Barcroft-Warburg manometer.	8	✓				✓			✓						✓	
Using Warburg manometer in measuring consumed O_2 during respiration	8	✓		✓	✓	✓									✓	
Using Warburg manometer in measuring O_2evolution	9	✓		✓	✓	✓							✓	✓	✓	✓

during photosynthesis.																
Research methods in manometry.	10	✓	✓	✓	✓	✓	✓	✓	✓							
Research methods in manometry.	11	✓			✓	✓										
Information flow metabolism.	12	✓			✓	✓										
Information flow in catabolism (respiration) and the rate of respiration under different conditions.	13	✓			✓	✓	✓	✓	✓				✓	✓	✓	✓
Types of respiration and respiratory quotient (RQ).	14	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
Nitrogen Metabolism																
Nitrogen fixation	1	✓	✓	✓	✓	✓							✓	✓	✓	✓
Symbiotic nitrogen fixation	2					✓									✓	✓
Non symbiotic nitrogen fixation	3					✓									✓	✓
Mechanism of nitrogen	4	✓	✓	✓	✓	✓									✓	✓

fixation																
Absorption of nitrogen by plants and the nitrate reduction	5	✓	✓	✓	✓	✓										✓
Inorganic nitrogen	6	✓			✓	✓							✓	✓	✓	✓
Organic nitrogen (amino acid, amides, amines, nitrogen bases and nucleotides)	7	✓			✓	✓							✓	✓	✓	✓
Protein structure and function	8	✓	✓	✓	✓											✓
Functional classification of proteins: 1- regulation and transport,	9	✓	✓					✓	✓				✓	✓	✓	✓
2- storage proteins,	10	✓	✓					✓	✓					✓	✓	✓
3- movement and protective proteins,	11	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
5- structural proteins,	12				✓				✓				✓	✓	✓	✓
6- catalytic proteins	13				✓	✓								✓	✓	✓
Research methods in nitrogen metabolism.	14	✓	✓	✓			✓	✓	✓				✓	✓		

Nitrogen fixation	15			✓	✓	✓	✓	✓	✓				✓			✓
Assessement	16															

5.2- Learning and Teaching Methods

Learing Method	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Lecture	√	√	√	√	√		√		√							√	√		√	
Discussion (Brain Storming)																				
Self-learing (Essay)																				
Field Trips																				
Practical																				

5.3- Assessment Methods

Assessment Methods	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√			√			√	√										
MCQ																				
Student Activity																				
Practical																				

Course coordinator: Prof.Dr. El Sayed Ahmed Morsey

Head of Department: Prof. Dr. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Plant Physiology

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014-2015, Two terms
Date of specification approval	2014

A- Basic Information

Title: **Computer**	Code: 1527
	Lecture: 3
Tutorial:	Practical: -
Total:	
Coordinator	**Prof. Mohamed El-Awady**
Other Staff	**Prof. Mahmoud Kamel, Prof. Ahmed El-Shishtawy, Prof. Qadry Zakaria**
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	**Lecture: 28 x 1h lectures** **Practical: 28 x 1h lectures**

B- Professional Information

Course aims:

Develop their capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies. Underpin academic work throughout postgraduate studies.Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices

2. Intended learning outcomes of course (ILOs)

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Recognize the diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.

A2. Arrange powerful presentation using sophisticated software packages.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-   B1. Integrate different application programs to develop effective information analysis and presentation.   B2. Solve scientific problems using computer programming

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-   C5. Use a number of computer packages to present information.   C6. Perform necessary graphical, statistical and frequency analyses of different types of data.   C7. Use of different internet resources.   C8. Use of different photo enhancing and manipulation techniques.

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-   D7. Use the internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Lectures 1-2	Methods for graphical representations, Data analysis and Data modeling **Assignment 1** : **Using Application programs** Calculation of Slope and intersection of lines , Best fitting for data, Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)
Lectures 3-5	Statistical Data analysis **Assignment 2** : **Using Application programs** Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data

Lecture 6-7	Creating powerful presentation including charts, images, video, etc and different attractive animations
	Assignment 3 : **Using PowerPoint program**
	Design a real and powerful presentation with different acquired skills
Lecture 8-9	Use of internet capabilities and searching engines
	Assignment 4: Using the Internet
	Life search on the internet for some real information
Lecture 10-11	Creating Data Base and related Queries and Reports
	Assignment 5: Using Application programs
	Creating a real Data Base and apply different queries and reports to extract useful information
Lecture 12-13	Computer programming language
	Assignment 6: Programming using Visual Basic 6
	Solving real problems using a computer language
Lecture 14-15	Photo manipulation and enhancement using the photoshop
	Assignment 7: **Using the Photoshop program**
	Practicing on manipulation and enhancing of images
Lectures 16	Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities

4. Teaching and learning methods

6. Lectures ☒
7. Practical training / laboratory ☒
8. Seminar / Workshop ☐
9. Class Activity -

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P
Semester work	to assess	-

Assessment schedule

Assessment 1	Practical exam	Week	15
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	60	%
Practical Examination	40	%
Semester work		%
Total	100	%

6. List of references

Course notes

- Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

Essential books (text books)

Recommended books

Web sites

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

Course coordinator:

Prof.Dr. Mohamed El-Awady

Head of Department:

Prof. Dr. Alaa Abou-Zeid

Date: / 8 /2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1527, course title: Computer

Course Contents	Weeks	Course outcomes ILOs								
		Knowledge and nderstanding		Intellectual		Practical				Tranferrable
Computer		A1	A2	B1	B2	C1	C2	C3	C4	D1
Methods for graphical representations, Data analysis and Data modeling	1	✓	✓	✓	✓	✓	✓	✓	✓	✓
Assignment 1 : **Using Application programs** Calculation of Slope and intersection of lines , Best fitting for data, Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)	2	✓								
Statistical Data analysis	3-5	✓								
Assignment 2 : **Using Application programs** Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data		✓								
Creating powerful presentation including charts, images,	6-7	✓				✓	✓	✓	✓	✓

video, etc and different attractive animations										
Assignment 3 : **Using PowerPoint program** Design a real and powerful presentation with different acquired skills		✓						✓	✓	✓
Use of internet capabilities and searching engines	8-9	✓	✓					✓	✓	✓
Assignment 4: Using the Internet Life search on the internet for some real information		✓	✓	✓	✓	✓	✓	✓	✓	✓
Creating Data Base and related Queries and Reports	10-11	✓	✓					✓		✓
Assignment 5: Using Application programs Creating a real Data Base and apply different queries and reports to extract useful information		✓	✓					✓		✓
Computer programming language	12-13	✓		✓	✓					✓
Assignment 6: Programming using Visual Basic 6 Solving real problems using a computer		✓							✓	✓

languag										
Photo manipulation and enhancement using the photoshop	14-15	✓	✓	✓	✓	✓				✓
Assignment 7: **Using the Photoshop program** Practicing on manipulation and enhancing of images		✓					✓	✓	✓	✓
Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities	16			✓	✓					✓
Assessement										

Learning and Teaching Methods

Learing Method		**Course outcomes ILOs**																		
	Knowledge and Understanding					**Intellectual Skills**					**Professional and Practical Skills**					**General and Transferable Skills**				
	A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**C1**	**C2**	**C3**	**C4**	**C5**	**D1**	**D2**	**D3**	**D4**	**D5**
Lecture	√	√	√	√	√		√	√		√										
Discussion (Brain Storming)																				
Self-learing (Essay)																				
Field Trips																				
Practical											√	√	√	√	√					

Assessment Methods

Assessment Methods		Course outcomes ILOs																		
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√	√	√		√													
MCQ																				
Student Activity																				
Practical											√		√		√					
Assessment Methods																				

Course coordinator: Prof.Dr. Mohamed El-Awady

Head of Department: Prof. Dr. Alaa Abou-Zeid

M.Sc. Programme
of
Genetics

Tanta University, Faculty of Science

M. Sc. program specifications of Genetics

Department offering the program	Botany Department
Academic year	2014-2015
Date of specification approval	08/2014

A- Basic Information

Program title:	M. Sc. degree in Botany (Genetics)
Program type	Single
Coordinator:	Prof. Dr. Adel R. El-Shanshoury
External Evaluator (s):	Prof.Dr. Mahmoud M. Sakr. Egyptian Academy of Science, ENC
QAA Benchmarking Standards	Academic Reference Standards (ARS)
Program References	Bioscience, Egyptian Code of Assessment
Date of Delivery	Every year in September
Review Date	Internal Periodic Review, Summer 2014

B- Professional Information

5. Program aims

Aims

To understand main aspects of chromosome biology, learn modern genetics techniques, provide intense hands-on training in Recombinant DNA Methods and Genetic Engineering, explore theory and practice of population genetics, characterize and arranging plants in an orderly manner, improve theoretical and practical fundaments of cell and tissue culture techniques, and know the basic statistical procedures used to analyze data

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should have acquired knowledge and understanding of the underlying concepts and principles of**:**

A26. Chromosome biology

A27. Recombinant DNA methods, and chemistry of protein synthesis and nucleotides metabolism.

A28. Genetic engineering,

A29. ||Population genetics, and characterizing and arranging plants in an orderly manner

A30. Cell and tissue culture techniques

A31. IT and bbasic statistical procedures used to analyze data

B. Intellectual skills:

At the end of this module students should have acquired the ability to :

B6. Think logically and organize tasks into a structured form.

B7. Assimilate knowledge and ideas based on wide reading and through the internet.

B8. Understand the evolving state of knowledge in a rapidly developing field.

B9. Construct and test hypothesis.

B10. Plan, conduct and write a report on an independent research project

C. Professional and practical skills

At the end of this module students should have acquired the following skills:

C26. Conduct basic techniques and methods to the studies and research in cytogenetics and population genetics.

C27. Be able prepare written protocols for experimental procedures and collect and interpret data from experimental observations and measurements

C28. Be able to design and conduct individual and shared research projects both in the laboratory and in the field.

C29. Be able to use computer software and web sites and other forms of information technology for data collection, analysis and presentations

D. General and transferable skills:

D45. Work in a team and be able to cooperate with others

D46. Demonstrate written and verbal communication skills using IT in work and in life

D47. Have knowledge of accounting and management.

D48. Ability to manage time and resources

D49. Present ideas and arguments in a structured manner

E. Teaching and learning

Knowledge will be developed through

2. Lectures
3. Practicals

F. Assessment

A wide variety of assessment methods are used

1. Written exam.
2. Practical exam.

3. Academic Reference Standards:

The Academic Reference Standards for the award of master in Plant Genetics as well as the attributes and capabilities of the graduate to provide students with the main concepts of plant genetics, teach and train students the principles and main concepts in genetics, understand the basic molecular tools of plants, protein and DNA and to know the basic statistical procedures used to analyze data.

I. Knowledge and Understanding:

Approaches to study and forms of subject knowledge likely to be common to all bioscience degree programmes will include the following:

- knowledge and understanding of the processes and mechanisms of life
    - From molecular to cellular.
    - From Organism to community.
- engagement with the essential facts, major concepts, principles and theories associated with the chosen discipline.
- understanding of information and data, and their setting within a theoretical framework.
- familiarity with the:
    - Terminology.
    - Nomenclature.
    - Classification systems as appropriate.

- Methods of acquiring, interpreting and analysing biological. information with a critical understanding of the appropriate contexts for their use through the:
    - Study of texts.
    - Original papers.
    - Reports and data sets.
- Developing knowledge about the diversity of life and its evolution.
- Knowledge of a range of practical techniques and methodologies, including :
    - Data analysis.
    - Use of statistics.
- Engagement with current developments in the biosciences and their applications, and the philosophical and ethical issues involved.
- The applicability of the biosciences to the careers to which graduates will be progressing.

II. Skills

C. Generic skills

- an appreciation of the complexity and diversity of life processes through the study of organisms, their molecular, cellular and physiological processes, their genetics and evolution, and the interrelationships between them and their environment.
- the ability to read and use appropriate literature with a full and critical understanding.
- the capacity to give a clear and accurate account of a subject.
- critical and analytical skills: a recognition that statements. should be tested and that evidence is subject to assessment and critical evaluation.
- the ability to employ a variety of methods of study in investigating, recording and analyzing material.
- the ability to think independent, set tasks and solve problems.

D. Key skills

The specific key skills that should be developed in bioscience degree courses are subdivided into:-

1. Intellectual skills

- Recognising and applying subject-specific theories, concepts or principles. For example:
    - The relationship between genes and proteins.
    - The nature of essential nutrients in microbes, cells, plants and animals;
- Analyzing and summarizing information critically, including published research or reports;
- Obtaining and integrating several lines of subject-specific evidence to formulate and test hypotheses;
- Applying subject knowledge and understanding to address familiar and unfamiliar problems

2. Practical skills

- Designing, planning, conducting and reporting on investigations. The data may be obtained through:
    - individual
    - group projects

- Obtaining, recording, collecting and analyzing data using appropriate techniques in the field and/or laboratory, working by themselves or in a group
- Undertaking field and/or laboratory investigations of living systems in a responsible, safe and ethical manner. For example, Students must pay due attention to risk assessment, relevant health and safety regulations, and respect for animal & plant life
- In some Bioscience degrees, graduates will learn to respect rights of access, for example:-

- In field work or in order to map the genes of a community, family or group of plants or animals, including humans. They should show sensitivity to the impact of investigations on:
    - the environment.
    - the organisms under investigation.
    - other stakeholders.

- Preparing, processing, interpreting and presenting data, using appropriate qualitative and quantitative techniques:
    - Statistical programmes.
    - Spreadsheets.
    - Programs for presenting data visually.
- Solving problems by a variety of methods including the use of computers.
- Using the internet and other electronic sources critically as a means of communication and a source of information.

3. Interpersonal and teamwork skills

- Identifying individual and collective goals and responsibilities and performing in a manner appropriate to these roles;
- Recognising and respecting the views and opinions of other team members;
- Negotiating skills;
- Evaluating performance as an individual and a team member; evaluating the performance of others;
- Developing an appreciation of the interdisciplinary nature of science and of the validity of different points of view.

4. Self-management and professional development skills

- Developing the skills necessary for self-managed and lifelong learning (e.g. working independent, time management and organisation skills);
- Identifying and working towards targets for personal, academic and career development;
- Developing an adaptable, flexible, and effective approach to study and work.

4.a.Program duration: Minimum two years.

4.b.Program Structure:

4. b.1. The First Preliminary Year:

All applicants admitted to the master's program are required to study 6 selected theoretical courses and one practical course approved by the department council from the master courses offered by the department for one academic year. A part of the M.Sc. courses offered by the Botany Department, the student should study a course in English language for a minimum one hour per week. Albeit, students who have taken equivalent English language course may be exampled from it upon the recommendation of the Faculty Council.

No. of hours per week: 12 Lectures and 6 hours practical

The registration for the preliminary year takes place in October, and the final exam. Is held once a year (June) in the date approved by the Faculty Council.

Grade Assessment:

Final Written Exam.60%

Final Practical Exam 40%

*< 60% failed

60-69 passed, 70-79 good, 80-89 very good, >90% excellent

*Failed students can repeat the course (s) only once.

4. b.2. The second year:

If the student passes the final examination, he/she will be a legible for continuation and registration to carry out research and starts thesis preparation. The thesis could be submitted after one year.

5. Program Contents and structure:

N	Code	Course Name	Lecturer
1	1553	Molecular Biology and Biochemistry	Prof. Dr. Mohamed EL-Anwar Osman Prof. Dr. Soad El-Feky Dr. Mohamed Elhiti
2	1551	Cytogenetics	Prof. Dr. Adel R. El-Shanshoury Prof. Dr. Hanan Ibrahem Dr. Marowa Hamouda
3	1552	Genetic Engineering	Prof. Dr. Safaa A. Radwan Dr. Mohamed Elhiti
4	1554	Population genetics and Cell and Tissue Culture	Prof. Dr. Adel R. El-Shanshoury Prof. Dr. Reda Gaafar Dr. Mohamed Elhiti
5	1558	Statistics and experimental taxonomy	Prof. Dr. Mhamoud Abu-Elyazied Prof. Dr. Adel El-Shanshoury Prof. Dr. Reda Gaafar
6	1557	Computer	Prof. Dr. Mohamed El-Awady.

Level 1	**Obligatory Four Courses**					
Code Proposed	**Course Title**	**Term 1**		**Term 2**		**Cred.**
		Thr	Pract	Thr	Prac	
1551	Cytogenetics	1	2	1		3
1552	Genetic Engineering	1		1		2
1553	Molecular Biology & Biochemistry	1		1		2
1554	Population genetics & Plant Cell and Tissue Culture	2	2	2		4
1557	Computer	1	1			2
1558	Biostatistics & Experimental taxonomy	2		2	4	4

Course Contents of Plant Genetics

Course Name	Code No	Contents
Molecular Biology and Biochemistry	1553	Information flow in the cell, Information flow in the cell, Structure and organization of nuclear genes, Structure and organization of nuclear genes, Replication and repair of nuclear genes, Replication and repair of nuclear genes, Expression of nuclear genes, Expression of nuclear genes, Chloroplast genome, Mitochondrial genome, Chloroplast genome, Mitochondrial genome, Molecular basis of genetic changes, Molecular basis of genetic changes, Molecular biology research methods, Molecular biology research methods.
Cytogenetics	1550	Cell Structure., Cell function and bioenergy, Functional and strcutral chloroplast, Functional and strcutral mitochondria, Functional and strcutral nucleus, Choromosomal structure and function, Behavior of chromosome in mitosis, Behavior of chromosome in meiosis, DNA organization and gene structure, DNA organization and gene structure, Karyotyping. Idograme, Identification according to karyotyping and idograme, Role of chromosome in diagnosis to some genetic diseases.
Genetic Engineering	1552	Revision of basic molecular genetics, Reviewing gene cloning procedures, Discussions on the topics of the course and distribution of assignments, Methods of gene transfer to plants, Methods of gene transfer to microorganisms, Methods of gene transfer to animals, Application of gene technology in basic research, Application of gene technology in pharmaceutical industry and health care, Application of gene technology in plant breeding, Molecular markers in genetic engineering, Bioinformatics in genetic engineering Genetic engineering and biodiversity, Genetic Engineering and bio-safety, Integrated problems and visits to biotechnology centers, Round up discussions on the topics of the course, Presentations of assignments.
Populati	15	Methods of cell and tissue culture, Tissue culture nutrient media,

on genetics and Cell and Tissue Culture	54	Laboratory organization for tissue cultures, Culture of haploid cell, Isolation and fusion of protoplast, Propagation of plants from tissue cultures, Propagation of plants from fused protoplast, Cytology of cultured cells, Genetic variability through *in vitro* tissue and cell culture, Genetic variability through *in vitro* tissue and cell culture, Use of tissue cultures in gene transfer. Use of tissue cultures in gene transfer, Use of tissue cultures approach for the production of plants adapted to environmental stress, Use of tissue cultures approach for the production of plants adapted to environmental stress.
Statistics and experimental Taxonomy	15 51	Introduction Biostatistics as a tool of scientific research Sampling of attributes Frequency and probability distributions Normal distribution Binomial distribution Poisson distribution Tests of significance Round-up discussion on the previous topics Partial examination Introductory note on analysis of variance Data transformations One-way analysis of variance Some basic experimental designs (completely random, randomized complete block and Latin square designs) Two-way analysis of variance Split-plot experimental design Least significant difference (LSD) and least significant range (LSR) tests Round-up discussion on the previous topics Partial examination Simple linear regression Simple linear correlation Rank correlation Curve fitting and method of least squares Multiple correlation Multiple regression Analysis of time series Round-up discussion on the previous topics Round-up discussion on the all topics of the course (part one) Round-up discussion on the all topics of the course (part two) Final examination

		Experimental Taxonomy **Topic** General principles Biotic factors (positive and negative interactions) Genetic factors (morphological characters and variation in phenotype alteration) The use of chromosome information in plant taxonomy Chromosome behavior in relation to plant taxonomy Chromosome banding pattern variation Pollen grain structure variation and taxonomy The use of some chemical compounds distribution in plant taxonomy The importance of DNA hybridization in plant taxonomy The use of DNA contents in plant taxonomy Importance of amino acid sequences in taxonomy Characteristics of wildlife conservation (e.g. biodiversiy,) Species specification resulted from chromosome alteration Brief description of the Egyptian species evolution
Computer	1573	Visual basic, power point, internet and Photoshop program

6.Thesis

Thesis is an essential aspect of M.Sc. program, for partial fulfillment of M.Sc. degree requirements. It is a formal written document representing sustained original research into an important intellectual issue. The thesis must be an independent effort which contributes to the accumulated understanding of the field in which it is written. The required research preparation and advanced research methods will help the student to focus his or her research effort, and provide general guidelines for research approach and report preparation. Thesis must meet precise academic standards and will be reviewed and approved by the candidate's supervising professor and external academic review committee.

The thesis should contain at least the following:

• Title page (title, name of student, university, faculty, name of program, date, supervisors
• Table of contents
• Introduction, containing a definition of the thesis statement, working method, the theoretical framework, and the aim.
• Literature review.
• Materials and methods.
• Results
• Discussion and conclusions
• References.

Language of the thesis

The thesis must be written in English language accompanied by a summary in Arabic.

Formation of Examiners Committees

A committee is selected by Botany Department Council. The M.Sc. Degree is awarded to the applicant by University, upon the recommendation of the department and the Faculty Council.

7-Admission:

An applicant for admission to the master's program should hold Botany B.Sc. degree in science either major with a minimum grade "Good" or double major with a minimum general grade "Good" from any Egyptian or equivalent institute. In addition, all applicants must satisfy the department graduate admission.

8- Evaluation of program intended learning outcomes

Evaluator	**Tool**	**Sample**
1 Alumni	Questionnaire	
2- Stakeholders (Employers)	Questionnaire	
3- External Evaluator(s)	Report	

Program coordinator:

Prof. Dr. Adel R. El-Shanshoury

Head of Department:

Prof. AlaaAbou-Zeid

Date: 8/2014

M. Sc. program Plant (Genetics) matrix

Course Title	Course code	Knowledge and Understanding						Intellectual skills					*practical skills*				General Skills				
		A 1	A 2	A 3	A 4	A 5	A 6	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	D 1	D 2	D 3	D 4	D 5
Molecular Biology and Biochemistry	1531	√	√	√	√			√	√	√	√	√	√	√	√	√	√	√	√	√	√
Biochemistry A	1532				√	√		√			√	√	√		√				√		√
Biochemistry B	1533	√			√	√		√			√				√	√	√	√		√	√
Physiology of Algae and Microorganisms	1534	√	√	√	√	√		√	√	√	√	√	√			√	√	√	√	√	√
Biostatistics	1538				√	√		√	√					√	√				√		
Computer	1573				√	√				√	√		√			√					

Brief Description of Courses for the M.Sc. in Genetics

A- Obligatory Courses

2-CYTOGENETICS

- Cell division and cell cycle analysis
- Chemical and architectural structure of chromosomes.
- Chromosomal changes.
- Karyotype analysis.
- Chromosome micro-dissection.
- Karyotype evolution.
- Methods of chromosomal studies.
- Molecular cytogenetics.
- Applications of cytogenetics in plant breeding and evolution.

2- GENETIC ENGINEERING

Principals of recombinant DNA technology.

Enzymes used for genetic engineering.

Cloning and transfer of genes.

Characterization of cloned and transferred genes.

Methods of gene sequencing.

Engineering plants to receive desired traits.

Applications of genetic engineering.

Future prospects in gene manipulation

3-MOLECULAR BIOLOGY

- Information flow in the cell.
- Structure and organization of nuclear genes.
- Replication and repair of nuclear genes.
- Expression of nuclear genes.
- Chloroplast genome.
- Mitochondrial genome.
- Molecular basis of genetic changes.
- Molecular biology research methods.

4- BIOSTATISTICS AND COMPUTER APPLICATIONS

- Frequency distribution
- Standard errors and confidence limits.
- Significance tests.
- Correlation measurements.
- Regression analysis.
- Cluster analysis and principal component analysis.
- Probability and its application in genetic research
- Introduction to basic computer programs used in genetics, systematics and evolution research

B- Optional Courses (four courses, 10 credits only)

5-POPULATION GENETICS

- Quantitative characters.
- Genetic structure of populations.
- Genetic equilibrium.

- Changes in gene frequency.
- Population diversification.
- Genetic variation and speciation.
- Reproduction isolation.
- Stable polymorphisms.
- Estimation of genetic variations.

6- EXPERIMENTAL SYSTEMATICS

- Taxa and species concepts.
- Cytotaxonomy.
- Chemosystematics.
- Molecular systematics.
- Numerical taxonomy.
- Modern phylogenetic methods.
- Preservation of plant material.
- Gene banks.

7- GENETICS AND EVOLUTION

- Historical background.
- The fine structure of the gene.
- Processes of evolutionary changes
- Natural selection.
- Mutation.
- Breeding systems.
- Genome evolution.
- Molecular basis of evolution.
- Factors promoting evolution.
- Biogeography and evolution.
- Biodiversity.

8- BIOCHEMISTRY

Introduction to biomolecules.

Function of proteins and enzymes.

Metabolism of carbohydrates and lipids.

Metabolism of proteins and amino acids.

Information carrying molecules in the cell.

Structure and function of bio-membranes.

Hormones and their role in growth.

Vitamins and their importance.

9- BIOSTATISTICS (Two semester - Theoretical : 1 hour/week, Practical : 2 hours/week)

- Part one: Statistical definitions, sampling of attributes, distributions (Normal, Binomial, Poisson), and tests of significance.
- Part two: Analysis of variance, experimental designs, association between variables, curve fitting and the method of least square, multiple and partial correlation and regressions, and analysis of time series.

9- MICROBIOLOGY

- **Viruses:**

  General features of virus reproduction and steps of virus multiplication, reproduction and genetic maps of some important, plant viruses as well as animal and bacterial virus The importance of viruses and the diseases caused by viruses.

- **Bacteria:**

  Major groups of bacteria, molecular systematics and bacterial evolution of bacteria. Industrial and medical bacteriology.

- **Fungi:**

  Major groups of fungi, pathogenic fungi, economic importance of fungi, molecular systematics, evolution and uses of fungi.

- **Micro-algae:**

  Major groups of micro-algae and their economic importance.

10- MICROBIAL GENETICS

- Organization of viral genome.
- Structure and organization of prokaryotic genome.
- Gene expression in prokaryotes.
- Gene expression in microbial eukaryotes.
- Gene mapping in virus and bacteria.
- Gene mapping in microbial eukaryotes.
- Scientific and practical application of microbial genetics.

11- CELL AND TISSUE CULTURE

- Methods used in plant cell and tissue culture.

- Tissue culture nutrient media.
- Laboratory organization for tissue cultures.
- Culture of haploid cells.
- Isolation and fusion of protoplast.
- Propagation of plants from tissue cultures.
- Propagation of plants from fused protoplast.
- Cytology of cultured cells.
- Genetic variability through in vitro tissue and cell culture.
- Use of tissue cultures in gene transfer.
- Use of tissue cultures approaches for the production of plants adapted to environmental stress, and other desired traits.

6. Programme admission requirements

Arrangements for admission are based on the national guidelines with no Faculty control on the number of newly enrolled students.

Candidates must satisfy the general admission requirements of the University, Faculty in Biology and also hold one of the following:

- General Certificate of Secondary Education (GCSE) in Biology
- GCSE in Biology at grade C or higher.
- International Baccalaureate (GCSE, American Diploma)?

7. Regulations for progression and programme completion

The Faculty has the following system to follow student's progression through the programmes in which they are enrolled.

- To progress from year one to year two or year two to year three or year three to year four, student need to pass in all course units with a maximum of fail in two.

- Student who fails their final examination at the first attempt will be eligible only for a “Pass” degree following any re-set examinations.

 Progression from level one to level two:

In order to progress from Level One to Level Two, a student shall normally achieve a threshold performance at part Level One. To gain a threshold performance at Level One, a student shall normally be required to pass in all course units with a maximum of fail in two.

Progression from ‘Level Two’ to ‘Level Three:’

To gain a threshold performance in ‘Level Two’, a student shall normally be required to achieve an aggregate score determined annually by the faculty council, and to pass in all course units. In order to pass from ‘Level Two’ to Part three, a student shall normally be required to achieve a threshold performance at 'Level Two' and to pass in all course units with a maximum of fail in two.

To pass the Summer Training, students must achieve a non-scored threshold training level base on submission of a formal written non-scored report from the training institution and the supervisor. Students who fail the summer training will (not) be required to transfer to the four year programme.

To obtain the degree at the end of the 'Level Four', student must pass in all course units and achieve at least an overall of 60%.

8. Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1. Senior students	Not applied yet	
2. Alumni	Not applied yet	
3. Stakeholders(Employers)	Not applied yet	
4. External Evaluator(s)(External Examiner(s))	Not applied yet	

Name	**Signature**	**Date**
Programme Coordinator: Prof. Dr. Adel El-Shanshoury (أ.د.عادل الشنشوري)	………………………………	/8/2014
Head of Quality Assurance Unit: Prof. Hoda Kamal **(أ. د.هدي كمال)**	………………………………	/8/2014
Dean of the Faculty: Prof. Tarek Fayed **(أ. د.طارق فايد)**	………………………………	/8/2014

Tanta University, Faculty of Science

M. Sc. Course specifications of Genetics

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014/2015
Date of specification approval	8/2014

A- Basic Information

Title: **Molecular Biology and Biochemistry**	Code: 1553
Tutorial:	Practical: --
Total:	
Coordinator	**Prof. Dr. Mohamed El-Anwar** **Prof.Dr. Soad El-Feky** **Dr. Mohamed Elhiti**
Other Staff	
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	**1st semester: 14 x 2h lectures** **2nd semester: 14 x 2h lectures**

B- Professional Information

6. **course aims:**

Teach advanced subjects of molecular biology and biochemistry including the structure and synthesis and degredation of proteins, nucleic acids and nucleotides.

7. **Intended learning outcomes of course (ILOs)**

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Recognize the current knowledge of plant molecular biology.

A2. Identify how plant molecular biology is applied to elucidate the mechanisms underlying complex cellular and organismal processes

A3. Recognize some details in the exciting and expanding fields associated with plant structural and functional genomics.

A4. Identify the basics of plant gene structure and function.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B1. Analyze the concepts of advanced topics in plant molecular biology and biochemistry.

B2. Assess the merits of contrasting theories and explanations in biochemistry and molecular Biology

c. There is no practical Skills

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-

D1. Acquire, analyze, synthesize, summarize and present information and ideas from a wide range of sources.

D2. Communicate effectively by written, spoken and graphical means using appropriate techniques.

D3. Work effectively with a range of types of information technology.

D4. Work either alone or with others to achieve an objective.

3. Contents

Section I	
Week	**Topic**
1	Information flow in the cell.
2	Information flow in the cell.
3	Structure and organization of nuclear genes.
4	Structure and organization of nuclear genes.
5	Replication and repair of nuclear genes.
6	Replication and repair of nuclear genes.
7	Expression of nuclear genes.
8	Expression of nuclear genes.

9	Chloroplast genome, Mitochondrial genome..
10	Chloroplast genome, Mitochondrial genome.
11	Molecular basis of genetic changes.
12	Molecular basis of genetic changes.
13	Molecular biology research methods
14	Molecular biology research methods
Section II	
Week	**Topic**
1	Endo- symbiosis and origin of Eukaryotes (Evidence at the Molecular level)
2	Secondary endosymbiosis :Engulfing Eukaryotes (Evidence at the Molecular level)
3	The nucleus
4	Nucleosomes and Transcription
5	Silencers, Steroid receptors and their response elements
6	T cell receptors, Antibody structure
7	Histones and Nucleosomes
8	Histones acetylation and Chromatine Remodling
9	Receptor Mediated Endocytosis
10	Receptor Mediated Endocytosis
11	Proteins translocation into the lumen of the rough endoplasmic reticulum
12	Golgi complex: structure and function
13	Golgi complex: structure and function
14	Formation of receptors
Biochemistry (Amino acids and Proteins)	
Week	**Topic**
1	Introduction, classification of amino acids, chemical and physical properties of amino acids
2	Peptides structure, classes of proteins, protein functions

3	The levels of protein structure, Amino acids metabolism
4	Ammonia toxicity and hyper ammonia, Inherited diseases of aromatic amino acid catabolism
5	Aromatic amino acid metabolism, Nitrogen disposal
6	Deamination and Transamination
7	The execution of excess nitrogen
8	Nucleic Acids, Nucleic acids, Nucleotide structure and nomenclature
9	Purine and Pyrimidine metabolism, Pyrimidine biosynthesis
10	The structure and classes of ribonucleic acid, Storage and transmission of genetic information
11	Protein Synthesis, The expression of genetic information
12	The genetic code, Transcription
13	The synthesis of ribonucleic acid, protein synthesis in prokaryote
14	Structure of Eukaryotic chromosome and gene

11. Teaching and learning methods

a. Lectures ☒

b. Practical training / laboratory -

c. Seminar / Workshop ☐

d. Class Activity -

12. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	
Semester work	to assess	

Assessment schedule

Assessment 1	Practical exam	Week	-
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	100	%

Practical Examination		%
Total	100	%

13. List of references

Course notes

- Course notes and Laboratory manual authorized by the Council of Department of Botany.

Essential books (text books)

- Molecular Cell Biology (Hardcover) by Harvey Lodish, Arnold Berk, Chris A. Kaiser, Monty Krieger, Matthew P. Scott, Anthony Bretscher, Hidde Ploegh, Paul Matsudaira. Publisher: W. H. Freeman; 6th edition (June 15, 2007

Recommended books

- Molecular Biology of the Cell (Hardcover) Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter. Publisher: Garland Science; 5 edition

Web sites

http://www.rothamsted.bbsrc.ac.uk/notebook/courses/guide/

http://www.ncbi.nlm.nih.gov/

http://us.expasy.org/

14. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computer Presentations and Writing Boards
- Microscopes; Compound microscope.
- Microscopic Anatomical Preparations.
- Live plant Morphological Samples
- Library

Course coordinator:

Prof. **Mohamed El-Anwar**

Head of Department:

Prof. Dr. Alaa Abou-Zeid

Date: **08/2014**

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code:1553, course title:**Molecular biology and Biochmestry**

Course Contents	**Weeks**	**Knowledge and understanding**					**Intellectual**					**Tranferrable**				
		A 1	A 2	A 3	A 4	A 5	B 1	B 2	B 3	B 4	B 5	D 1	D 2	D 3	D 4	D 5
Information flow in the cell.	1	✓		✓	✓		✓	✓		✓		✓			✓	✓
Information flow in the cell.	2	✓	✓	✓		✓		✓				✓	✓	✓	✓	
Structure and organization of nuclear genes.	3	✓		✓	✓			✓		✓		✓	✓	✓		
Structure and organization of nuclear genes.	4		✓	✓	✓	✓	✓		✓				✓			✓
Replication and repair of nuclear genes.	5	✓	✓	✓	✓			✓		✓	✓					✓
Replication and repair of nuclear genes.	6	✓				✓		✓	✓		✓	✓	✓		✓	✓
Expression of nuclear genes.	7			✓	✓		✓	✓						✓		
Expression of	8	✓	✓			✓	✓	✓				✓	✓	✓	✓	

nuclear genes.																
Chloroplast genome, Mitochondrial genome..	9				✓		✓	✓				✓	✓	✓	✓	✓
Chloroplast genome,	10	✓			✓	✓	✓	✓				✓	✓	✓	✓	✓
Molecular basis of	11	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓
	12															
	13															
	14															
	1															
	2															
The nucleus	3	✓		✓			✓	✓		✓		✓	✓	✓	✓	✓
Nucleosomes and Transcription	4		✓		✓				✓	✓	✓	✓	✓	✓	✓	
Silencers, Steroid receptors and their response elements	5		✓			✓	✓		v			✓	✓	✓	✓	✓
T cell receptors, Antibody structure	6	✓	✓	✓		✓	✓		✓	✓	✓				✓	✓
Histones and Nucleosomes	7			✓	✓		✓	✓							✓	✓
Histones acetylation and Chromatine Remodling	8	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	

Receptor Mediated Endocytosis	9	✓			✓	✓	✓	✓	✓	✓		✓	✓			✓
Receptor Mediated Endocytosis	10			✓	✓	✓						✓			✓	✓
Proteins translocation into the lumen of the rough endoplasmic reticulum	11	✓	✓			✓	✓		✓		✓	✓	✓	✓	✓	
Golgi complex: structure and function	12	✓	✓	✓	✓		✓	✓				✓		✓	✓	✓
Golgi complex: structure and function	13	✓	✓	✓	✓		✓	✓		✓		✓	✓	✓	✓	✓
Formation of receptors	14		✓						✓		✓	✓	✓		✓	
Introduction , classification of amino acids, chemical and physical properties of amino acids	1	✓	✓	✓		✓					✓	✓	✓	✓	✓	✓
Peptides structure, classes of proteins, protein functions	2		✓	✓	✓	✓	✓	✓		✓				✓	✓	
The levels of	3	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓

protein structure, Amino acids metabolism																
Ammonia toxicity and hyper ammonia, Inherited diseases of aromatic amino acid catabolism	4	✓	✓		✓	✓			✓	✓		✓	✓	✓	✓	
Aromatic amino acid metabolism, Nitrogen disposal	5	✓	✓	✓	✓		✓	✓					✓	✓	✓	
Deamination and Transamination	6	✓	✓	✓	✓			✓		✓		✓	✓	✓	✓	
The execution of excess nitrogen	7	✓	✓			✓		✓	✓		✓	✓	✓	✓	✓	✓
Nucleic Acids, Nucleic acids, Nucleotide structure and nomenclature	8	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓
Purine and Pyrimidine metabolism, Pyrimidine biosynthesis	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

The structure and classes of ribonucleic acid, Storage and transmission of genetic information	10	✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Protein Synthesis, The expression of genetic information	11	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	
The genetic code, Transcriptio n	12	✓	✓					✓				✓	✓	✓	✓	
The synthesis of ribonucleic acid, protein synthesis in prokaryote	13	✓	✓	✓	✓	✓	✓	✓							✓	
Structure of Eukaryotic chromosome and gene	14	✓	✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	
thesis		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Learning and Teaching Methods

Learing Method	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Lecture	√	√	√	√	√		√			√										

Assessment Methods

Assessment Methods	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√	√	√			✓	✓											

Course coordinator: Prof. Adel El-Shanshoury

Head of Department: Prof. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Genetics

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014/2015, first term
Date of specification approval	08/2014

A- Basic Information

Title: **Cytogenetics**	Code: 1551
Tutorial:	Practical: 2
Total:	
Coordinator	**Prof. Adel Ramadan El-Shanshoury**
Other Staff	**Prof. Dr. Hanan Ibrahem**
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	**1st semester: 14 x 1h lectures** **Practical: 14 x 2h lectures** (first semester **2nd semester: 14 x 1h lectures** **Practical: 14 x 2h lectures** (second semester)

B- Professional Information

8. **course aims:**

Teach students basic principles and concepts of cell and tissue culture techniques. Provide students with the ability to adapt basic cell and culture procedure to specific research requirements. Teach students the basic principles and concepts of population genetics and related topics, Develop solutions to simple, problems through the application of population genetic theory and principles. Apply the basic principles of population genetics to the analysis of natural and managed systems.

9. **Intended learning outcomes of course (ILOs)**

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Recognize the advantages and limitations of cell culture in the production of plants adapted to environmental stress. A2. Describe the range of molecular laboratory techniques and standard statistical analyses for investigating population genetic variation A3. Identify the ecological and evolutionary factors that influence the genetic structure of populations A4. Explain the conditions under which cells can be cultured outside the body

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :- B1. Analyze practical and theoretical principles of cell culture. B2. Perform statistical analysis of population genetic data under limited supervision. B3. Solve simple genetic problems encountered in plant breeding program, animal husbandry, molecular diagnosis and medical applications. B4. Evaluate basic inheritance patterns and estimate the likelihood of inheritance of particular diseases. B5. Demonstrate the basis of genetic mapping. B6. Illustrate the relation between genetic and physical maps.

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :- C1. Plan experiments using cultured cells C2. Carry out cell culture, and associated laboratory techniques C3. Carry out the most common analysis techniques associated with cell culture

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :- D1. Present and analyze literature which covers cell culture D2. Use language relevant to cell culture, orally and in writing. D3. Work either alone or with others to achieve an objective

3. Contents (Theoritical/Practical):

Week	Topic
1	Cell Structure.

2	Cell function and bioenergy.
3	Functional and strcutral chloroplast.
4	Functional and strcutral mitochondria.
5	Functional and strcutral nucleus.
6	Choromosomal structure and function.
7	Behavior of chromosome in mitosis.
8	Behavior of chromosome in meiosis.
9	DNA organization and gene structure.
10	DNA organization and gene structure.
11	Karyotyping.
12	Idograme.
13	Identification according to karyotyping and idograme.
14	Role of chromosome in diagnosis to some genetic diseases. .

4. Teaching and learning methods

a. Lectures ☒

b. Practical training / laboratory ☒

c. Seminar / Workshop ☐

d. Class Activity -

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P
Semester work	to assess	-

Assessment schedule

Assessment 1	Practical exam	Week	15
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination 60 %

Practical Examination	40	%
Total	100	%

6. List of references

Course notes

- Course notes and Laboratory manual authorized by the Council of Department of Botany.

Essential books (text books)

- Plant Tissue Culture Concepts and Laboratory Exercises, Second Edition (Plastic Comb), by Robert N. Trigiano (Editor), Dennis J. Gray (Editor). Amazon.com Sales Rank

Recommended books

- Plants from Test Tubes: An Introduction to Micropropagation, by Lydiane Kyte http://www.amazon.com/Plants-Test-Tubes-Introduction-Micropropagation/dp/0881923613/ref=pd_bxgy_b_text_b - # (Author), John Kleyn (Author). Amazon.com Sales Rank)
- Falconer, D.S. and Mackay, T.F.C. 1996. Introduction to Quantitative Genetics. Longman Group Ltd. Essex, England. pp. 464.
- Hartl, Daniel L. 1988. A Primer of Population Genetics. Second Ed. Sinauer Associates, Inc. Sunderland Massachusetts. pp. 305.

Web sites

- *http://www.egymedicine-net/forumsx/showthoead.php/-l26550*
- *http://www.research.umbc.edu/`jwolf/method5.htm*

7. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computer Presentations and Writing Boards
- Microscopes; Compound microscope.
- Microscopic Anatomical Preparations.
- Live plant Morphological Samples
- Library

Course coordinator:

Prof. **Prof. Adel Ramadan El-Shanshoury**

Head of Department:

Prof. Alaa Abou-Zeid

Date:	**08/2014**

Course Contents – Course ILOs Matrix

	Course code: 1551	**Course title: Cytogenetics**															
Weeks	**Course content/ Theoritical-Practical**	Knowledge andunderstanding				Intellectual skills						Practical skills			Transferable skills		
		A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	B 5	B 6	C 1	C 2	C 3	D 1	D 2	D 3
1	Cell Structure.	√	√						√		√				√	√	√
2	Cell function and bioenergy	√	√						√	√					√	√	√
3	Functional and strcutral chloroplast.	√	√						√	√					√	√	√
4	Functional and strcutral mitochondria.	√	√		√		√		√	√	√				√	√	√
5	Functional and strcutral nucleus.	√	√	√	√	√	√		√	√	√				√		√
6	Choromosomal structure and function.	√		√	√		√			√	√				√		√
7	Behavior of chromosome in mitosis.	√					√	√	√		√						√

8	Behavior of chromosom e in meiosis	√	√	√		√	√	√	√	√							√
9	DNA organizatio n and gene structure.		√	√			√	√	√		√				√	√	√
10	DNA organizatio n and gene structure2	√	√		√			√	√	√	√			√	√	√	√
11	Karyotyping	√	√				√		√		√			√	√	√	√
12	Idograme.	√	√				√	√	√		√			√		√	√
13	Identificatio n according to karyotyping and idograme.	√	√				√	√	√	√	√				√	√	√
14	Role of chromosom e in diagnosis to some genetic diseases.	√		√	√			√		√		√		√		√	√

Learning and Teaching Methods

LearingMethod	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills						Professional and Practical Skills			General and Transferable Skills		
	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C1	C2	C3	D1	D2	D3
Lecture	√	√	√	√		√		√	√	√	√		√	√	√	
Discussion (Brain Storming)	√	√	√		√	√		√	√		√	√	√	√	√	√
Self-learing (Essay)	√	√	√	√	√		√	√		√	√	√	√		√	√
Field Trips										√				√		
Practical	√	√			√	√	√	√	√		√	√	√	√	√	√

Assessment Methods

AssessmentMethods	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills						Professional and Practical Skills			General and Transferable Skills		
	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C1	C2	C3	D1	D2	D3
Essay Question	√	√	√	√		√								√	√	
MCQ	√	√	√		√	√		√	√		√	√	√	√	√	√
Student Activity			√	√	√		√	√		√	√	√	√		√	√
Practical			√	√	√	√	√	√	√		√	√	√	√	√	√

Course Coordinator

Head of Botany Department

Prof. AlaaAbou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Genetics

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014/2015, first term
Date of specification approval	08/2014

A- Basic Information

Title: **Genetic Engineering**	Code: 1552
Tutorial:	Practical: --
Total:	
Coordinator	**Prof. saffa Radwan** **Dr. Mohamed Elhiti**
Other Staff	
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	**1st semester: 14 x 1h lectures** **2nd semester: 14 x 1h lectures**

B- Professional Information

10. **course aims:**

This course gives an opportunity to extend fundamental concepts and principles of biological and botanical knowledge particularly in recent topics of plant. Current include the following topics: Reviewing basic molecular genetics,Principles and applications of gene technology, Genetically Engineered products,Molecular markers and their applications and Bio-informatics.

11. Intended learning outcomes of course (ILOs)

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A.1- Describe the basic concepts of molecular biology and molecular genetics.

A.2- Explain concept and mechanism of molecular markers.

A.3 – Define the applications of gene technologies.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-
B1. Apply adequate background in Plant genetic Engineering. B2. Acquire the knowledge of transferring desirable foreign DNA to improve plant traits. B3. Analyze gene regulation in higher plants. B4. Solve problems and exercises concerned with the faithful transfer of genetic information

c- Professional and practical skills

There is no Practical skills

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-
D1. Use of the Internet sites to access information and prepare a research proposal. D2. Use of statistical packages related to the topics of the course. D3. Demonstrate written and verbal communication skills. D4. Use of databases and library search methods.

3. Contents

Week	Topic
1	Revision of basic molecular genetics
2	Reviewing gene cloning procedures
3	Discussions on the topics of the course and distribution of assignments
4	Methods of gene transfer to plants
5	Methods of gene transfer to microorganisms
6	Methods of gene transfer to animals
7	Application of gene technology in basic research
8	Application of gene technology in pharmaceutical industry and health care
9	Midterm Exam
10	Application of gene technology in plant breeding

11	Molecular markers in genetic engineering
12	Bioinformatics in genetic engineering
13	Genetic engineering and biodiversity
14	Genetic Engineering and bio-safety
15	Integrated problems and visits to biotechnology centres
16	Round up discussions on the topics of the course
17	Presentations of assignments
18	Final examination

15. Teaching and learning methods

a. Lectures	☒
b. Practical training / laboratory	☐
c. Seminar / Workshop	☐
d. Class Activity	-

16. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	-
Semester work	to assess	-

Assessment schedule

Assessment 1	Practical exam	Week	
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	100	%
Practical Examination		%
Total	100	%

17. List of references

Course notes

Essential books (text books)

- Henry, R.J.Ed. (2001). Plant Gennotyping: The DNA Fingerprinting of Plants. CABI Publishing

- Russel, P.J. (1998). Genetics, 5th ed. The Benjamin/Cummings Publishing Company Inc, an imprint of Addison Wesley Longman Inc., California, USA.

- Griffiths, A, Miller, J.F., Jeffery, H., Suzuki, D.T., Lewontin, R.C. and Gelbart, W.M. (2000). An Introduction to Genetic Analysis, 7th ed. WH Freeman, NY, USA.

Recommended books

- Kempken and Kempken (2006) Gentechnik bei Pflanzen, Springer Verlag

Web sites

http://www.emc.maricopa.edu/faculty/farabee/biobk/BioBookDNAMOLGEN.html

http://www.learn4good.com/bookstore/genetics_books_cds_for_academic_students.htm
Sites of publishers of science books and periodicals, e.g.. Springer Verlag, Academic press, Oxford John Wiley and sons. .etc….

18. Facilities required for teaching and learning

- Generic resources, such as the library.

- Electronic copies of past exam papers and example assessments.

- Computer Aided, such as E-mail, online conference, data show.

- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

Prof. Saffa radwan

Head of Department:

Prof. Alaa Abou-Zeid

Date: **08/2014**

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course Contents	**Weeks**	**Knowledge and understanding**					**Intellectual**					**Tranferrable**				
		A 1	A 2	A 3	A 4	A 5	B 1	B 2	B 3	B 4	B 5	D 1	D 2	D 3	D 4	D 5
Revision of basic molecular genetics	1	✓							✓	✓		✓	✓	✓	✓	
Reviewing gene cloning procedures	2	✓							✓	✓					✓	
Discussions on the topics of the course and distribution of assignments	3	✓	✓	✓			✓	✓	✓	✓					✓	
Methods of gene transfer to plants	4	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	
Methods of gene transfer to microorganisms	5	✓	✓	✓			✓	✓	✓						✓	
Methods of gene transfer to animals	6	✓					✓	✓	✓						✓	
Application of gene technology in basic research	7	✓					✓								✓	
Application	8	✓	✓	✓			✓			✓		✓	✓	✓	✓	

of gene technology in pharmaceutical industry and health care																
Midterm Exam	9	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	
Application of gene technology in plant breeding	10	✓													✓	
Molecular markers in genetic engineering	11	✓													✓	
Bioinformatics in genetic engineering	12	✓	✓	✓			✓	✓	✓	✓					✓	
Genetic engineering and biodiversity	13	✓	✓	✓			✓	✓	✓	✓					✓	
Genetic Engineering and bio-safety	14	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	
Integrated problems and visits to biotechnology centres	15	✓	✓									✓	✓	✓	✓	
Round up discussions on the topics of the course	16	✓	✓									✓			✓	
Presentations of	17	✓	✓									✓			✓	

assignments																
Final examination	18	✓	✓									✓			✓	
Assessment																

Learning and Teaching Methods

Learing Method	Course outcomes ILOs														
	Knowledge and Understanding					Intellectual Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	D1	D2	D3	D4	D5
Lecture	√	√	√	√	√		√		√						

Assessment Methods

Assessment Methods	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√	√	√		√		√											

Course coordinator: Prof. Saffa Radwan

Head of Department: Prof. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Genetics

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014/2015, first term
Date of specification approval	08/2014

A- Basic Information

Title: **Population genetics and Cell and Tissue Culture**	Code: 1554
Tutorial:	Practical: 2
Total:	
Coordinator	**Prof. Adel Ramadan El-Shanshoury**
Other Staff	**Prof. Dr. Mahmoud Abou Elyazeed Abdelhaak**
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	**1st semester: 14 x 2h lectures** **Practical: 14 x 2h lectures** (first semester **2nd semester: 14 x 2h lectures** **Practical: 14 x 2h lectures** (second semester)

B- Professional Information

12. **course aims:**

Teach students basic principles and concepts of cell and tissue culture techniques.Provide students with the ability to adapt basic cell and culture procedure to specific research requirements.Teach students the basic principles and concepts of population genetics and related topics, Develop solutions to simple, problems through the application of population genetic theory and principles. Apply the basic principles of population genetics to the analysis of natural and managed systems.

13. Intended learning outcomes of course (ILOs)

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-   A1. Recognize the advantages and limitations of cell culture in the production of plants adapted to environmental stress.   A2. Describe the range of molecular laboratory techniques and standard statistical analyses for investigating population genetic variation   A3. Identify the ecological and evolutionary factors that influence the genetic structure of populations   A4. Explain the conditions under which cells can be cultured outside the body

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-   B7. Analyze practical and theoretical principles of cell culture.   B8. Perform statistical analysis of population genetic data under limited supervision.   B9. Solve simple genetic problems encountered in plant breeding program, animal husbandry, molecular diagnosis and medical applications.   B10. Evaluate basic inheritance patterns and estimate the likelihood of inheritance of particular diseases.   B11. Demonstrate the basis of genetic mapping.   B12. Illustrate the relation between genetic and physical maps.

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-   C1. Plan experiments using cultured cells   C2. Carry out cell culture, and associated laboratory techniques   C3. Carry out the most common analysis techniques associated with cell culture

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-   D4. Present and analyze literature which covers cell culture   D5. Use language relevant to cell culture, orally and in writing.   D6. Work either alone or with others to achieve an objective

3. Contents

Week	Topic

1	Methods of cell and tissue culture.
2	Tissue culture nutrient media.
3	Laboratory organization for tissue cultures.
4	Culture of haploid cell.
5	Isolation and fusion of protoplast.
6	Propagation of plants from tissue cultures.
7	Propagation of plants from fused protoplast.
8	Cytology of cultured cells.
9	Genetic variability through *in vitro* tissue and cell culture.
10	Genetic variability through *in vitro* tissue and cell culture.
11	Use of tissue cultures in gene transfer.
12	Use of tissue cultures in gene transfer.
13	Use of tissue cultures approach for the production of plants adapted to environmental stress.
14	Use of tissue cultures approach for the production of plants adapted to environmental stress.

8. Teaching and learning methods

a. Lectures ☒

b. Practical training / laboratory ☒

c. Seminar / Workshop ☐

d. Class Activity -

9. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P
Semester work	to assess	-

Assessment schedule

Assessment 1	Practical exam	Week	15
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	60	%
Practical Examination	40	%
Total	100	%

10. List of references

Course notes

- Course notes and Laboratory manual authorized by the Council of Department of Botany.

Essential books (text books)

- Plant Tissue Culture Concepts and Laboratory Exercises, Second Edition (Plastic Comb), by Robert N. Trigiano (Editor), Dennis J. Gray (Editor). Amazon.com Sales Rank

Recommended books

- Plants from Test Tubes: An Introduction to Micropropagation, by Lydiane Kyte http://www.amazon.com/Plants-Test-Tubes-Introduction-Micropropagation/dp/0881923613/ref=pd_bxgy_b_text_b - # (Author), John Kleyn (Author). Amazon.com Sales Rank)
- Falconer, D.S. and Mackay, T.F.C. 1996. Introduction to Quantitative Genetics. Longman Group Ltd. Essex, England. pp. 464.
- Hartl, Daniel L. 1988. A Primer of Population Genetics. Second Ed. Sinauer Associates, Inc. Sunderland Massachusetts. pp. 305.

Web sites

- *http://www.egymedicine-net/forumsx/showthoead.php/-l26550*
- *http://www.research.umbc.edu/`jwolf/method5.htm*

11. Facilities required for teaching and learning

- Projectors: Video and Overhead.
- Computer Presentations and Writing Boards
- Microscopes; Compound microscope.
- Microscopic Anatomical Preparations.
- Live plant Morphological Samples
- Library

Course coordinator:

Prof. **Prof. Adel Ramadan El-Shanshoury**

Head of Department:

Prof. Alaa Abou-Zeid

Date: **08/2014**

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1554**, course title:** : **Population genetics and Cell and Tissue Culture**

Course Contents	Weeks	Knowledge and understanding					Intellectual					Practical					Tranferrable				
		A 1	A 2	A 3	A 4	A 5	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	C 5	D 1	D 2	D 3	D 4	D 5
Methods of cell and tissue culture.	1	✓									✓	✓	✓	✓			✓	✓	✓		
Tissue culture nutrient media.	2	✓									✓	✓	✓	✓			✓	✓	✓		
Laboratory organization for tissue cultures.	3	✓	✓	✓	✓		✓	✓	✓	✓											
Culture of haploid cell.	4				✓					✓	✓	✓	✓	✓							
Isolation and fusion of protoplast.	5	✓	✓	✓	✓		✓	✓			✓										
Propagation of plants from tissue cultures.	6			✓	✓		✓	✓	✓	✓	✓										

Propagation of plants from fused protoplast.	7				✓		✓			✓	✓						✓	✓	✓		
Cytology of cultured cells.	8	✓	✓		✓		✓			✓	✓						✓				
Genetic variability through *in vitro* tissue and cell culture.	9		✓		✓						✓						✓	✓	✓		
Genetic variability through *in vitro* tissue and cell culture.	10		✓		✓		✓	✓	✓	✓	✓								✓		
Use of tissue cultures in gene transfer.	11	✓	✓		✓		✓	✓		✓	✓	✓	✓	✓			✓	✓	✓		
Use of tissue cultures in gene transfer.	12				✓		✓	✓	✓				✓	✓					✓		
Use of tissue cultures approach for the production of	13	✓	✓		✓		✓	✓				✓	✓	✓			✓	✓	✓		

plants adapted to environmental stress.																					
Use of tissue cultures approach for the production of plants adapted to environmental stress.	14	✓	✓	✓	✓		✓					✓	✓	✓			✓	✓	✓		
Assessment																					

Learning and Teaching Methods

Learing Method		Course outcomes ILOs																		
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Lecture	√	√	√	√	√		√	√												
Practical											√	√	√	√	√					

Assessment Methods

Assessment Methods		Course outcomes ILOs																		
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√	√	√	√		√	√											
Practical												√	√		√					

Course coordinator: Prof. Prof. Adel El-Shanshoury

Head of -- Department: Prof. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Genetics

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014-2015
Date of specification approval	08/2014

A- Basic Information

Title: Statistics and experimental Taxonomy	Code: 1551
Tutorial:	Practical: 2
Total:	
Coordinator	**Prof. Kamal Shaltout**
Other Staff	**Prof. Dr. Mhamoud Abu-Elyazied** **Prof. Dr. Adel El-Shanshoury** **Prof. Dr. Reda Gaafar**
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	**1st semester: 14 x 2h lectures** **Practical: 14 x 4h lectures** (first semester **2nd semester: 14 x 2h lectures** **Practical: 14 x 4h lectures** (second semester)

B- Professional Information

14. **course aims:**

The first module gives students an opportunity to: Achieve a comprehensible form of the too much data that characterize the modern biological research. Apply statistical tests for evaluating differences, variations and associations between populations and their significance in probability terms. Teach the students the modern software programs for statistical analysis and to interpret and make inferences from analysis of set of observations sampled from a population. Find out the best possible experimental design that provides the best sorting out of the controlled and uncontrolled variations. **The second module gives students an opportunity to:** Teach students the relationships between plants and biotic and a biotic factors, the basis of plant diversity and plant conservation, Provide students with skills which enable them to diagnose the characteristics of plants from all types of evidence and Explain the evolutionary mechanisms, relationships between plant species, and phylogenetic trends in diverse taxa.

2. **Intended learning outcomes of course (ILOs)**

A-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

Module 1:

A1. Identify the role of the biostatistics in the procedure of the biological scientific research.

A2. Recognize the association between variables in normal and non-normal distributed populations (correlations and regressions).

A3. Compare between each pair of treatments in multi-treatment experiments

A4. Explain the tests of significance of difference between two or more than two sampled populations.

A5. Discuss the application, advantages and disadvantages of the different types of experimental designs.

Module 2:

A1. Recognize individual change over time and relation of this change to diversity

A2. define the importance of the environment in the survival and distribution of plants

A3. Identify the importance of the natural reserves and their role in conserving diversity.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

Module 1:

B6. Differentiate between the characteristics of the different types of distributions

B7. Demonstrate the principles and approaches underlying current methods of biostatistics and its application using computer software programs

B8. Apply the best suitable statistical tests for the different biological experiments

B9. Design suitable experimental

B10. Analyze the results statistically

Module 2:

B1. Discuss the principles, underlying plant taxonomy, diversity, conservation.

B2. Analyze the importance of wild life for sustainable development.

B3. Critically evaluate the primary literature in particular areas of plant ecology and taxonomy.

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-

Module 1:

C1. Perform the best suitable statistical tests for the different biological experiments

C2. Provide the statistical consultation for the students and researchers of biology.

C3. Prepare the suitable experimental design and how to analyze the results statistically

Module 2:

C1. Solve biological problems by a variety of methods including computer and other recent tools

C2. Demonstrate skills and knowledge required to perform laboratory experiments safely with appropriate equipment.

C3. Select a representative sample considering its validity, accuracy and reliability during plant collection.

C4. Apply field and laboratory investigations to establish expertise in plant species identification in a range of contrasting Egyptian habitats.

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-

Module 1:

D5. Use databases and library search methods as well as internet sites

D6. Independent learning ability required for continuing professional development

D7. Work with others, use and manage ideas and information. D8. Demonstrate written and verbal communication skills on modern approaches **Module 2:** D1. Independent learning ability required for continuing professional development. D2. Able to prepare complete and clean scientific report D3. Ability to work with others, use and manage ideas and information D4. Drawing and labeling curves, habits, sections …. etc.

3. Contents

Statistics	
Week	**Topic**
1	Introduction
2	Biostatistics as a tool of scientific research
3	Sampling of attributes
4	Frequency and probability distributions
5	Normal distribution
6	Binomial distribution
7	Poisson distribution
8	Tests of significance
9	Round-up discussion on the previous topics
10	Partial examination
11	Introductory note on analysis of variance
12	Data transformations
13	One-way analysis of variance
14	Some basic experimental designs (completely random, randomized complete block and Latin square designs)
15	Two-way analysis of variance
16	Split-plot experimental design
17	Least significant difference (LSD) and least significant range (LSR) tests
18	Round-up discussion on the previous topics
19	Partial examination
20	Simple linear regression
21	Simple linear correlation
22	Rank correlation
23	Curve fitting and method of least squares
24	Multiple correlation
25	Multiple regression
26	Analysis of time series
27	Round-up discussion on the previous topics
28	Round-up discussion on the all topics of the course (part one)
29	Round-up discussion on the all topics of the course (part two)
30	Final examination
Experimental Taxonomy	
Week	**Topic**
1	General principles

2	Biotic factors (positive and negative interactions)
3	Genetic factors (morphological characters and variation in phenotype alteration)
4	The use of chromosome information in plant taxonomy
5	Chromosome behavior in relation to plant taxonomy
6	Chromosome banding pattern variation
7	Pollen grain structure variation and taxonomy
8	The use of some chemical compounds distribution in plant taxonomy
9	The importance of DNA hybridization in plant taxonomy
10	The use of DNA contents in plant taxonomy
11	Importance of amino acid sequences in taxonomy
12	Characteristics of wildlife conservation (e.g. biodiversiy,)
13	Species specification resulted from chromosome alteration
14	Brief description of the Egyptian species evolution

4. Teaching and learning methods

a. Lectures ☒
b. Practical training / laboratory ☒
c. Seminar / Workshop ☐
d. Class Activity -

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P
Semester work	to assess	

Assessment schedule

Assessment 1	Practical exam	Week	15
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	60	%
Practical Examination	40	%
Total	100	%

6. List of references

Course notes

Essential books (text books)

- Zar, J. H. 1984. ***Biostatistical Analysis***: Second Edition. Prentice Hall, Inc., New Jersy, USA.
- Snedecor, G. W. & Cochran, W. G. 1967. ***Satistical Methods***. The Iowa State University Press, Iowa, USA.
- Plant Systematics by Michael Simpso.
- Plant Systematics (Paperback) by Gurcharan Singh.
- Plant Systematics (Hardcover) by Samuel B. Jones (Author), Arlene E. 0 Luchsinger (Editor Heywood, V. H. Flowering Plants of the World.

Recommended books

- Voelkl, K. E. & Gerber, S. B. 1999. Using SPSS for Windows: Data Analysis and Graphics. Springer, New York, USA.
- Stephens, L. J. 1998. Beginning Statistics. Schaum's Outline Series, McGraw-Hill. New York, USA.
- Introduction to Plant Systematics. 2ND ED. (ISBN: 0070327963) Jones, Samuel B.; Luchsinger, Arlene E.

Web sites

- http://www.eulc.edu.eg/v2/libraries/
- http://www.google.com
- http://www.botan.su.se/systematik/default.html
- http://www.science.siu.edu/PlantBiology/PLB449/Systematics

7. Facilities required for teaching and learning

- Generic resources, such as the library.
- Electronic copies of past exam papers and example assessments.
- Computer Aided, such as E-mail, online conference, data show.
- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

Prof. Kamal Shaltout

Head of Department:

Prof. Alaa Abou-Zeid

Date: 08/2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1551, **course title:** Statistics and Biostatistics

Course Contents	W	Knowledge and understanding					Intellectual					Practical					Tranferrable				
		A 1	A 2	A 3	A 4	A 5	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	C 5	D 1	D 2	D 3	D 4	D 5
Introduction	1	✓	✓	✓	✓									✓						✓	
Biostatistics as a tool of scientific research	2	✓	✓	✓	✓		✓					✓		✓			✓	✓	✓	✓	
Sampling of attributes	3	✓	✓														✓			✓	
Frequency and probability distributions	4	✓	✓														✓	✓	✓	✓	
Normal distribution	5	✓	✓														✓			✓	
Binomial distribution	6				✓		✓	✓	✓	✓	✓			✓							
Poisson distribution	7	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓							
Tests of significance	8	✓			✓				✓		✓			✓			✓	✓	✓	✓	
Round-	9	✓			✓				✓		✓			✓			✓			✓	

discussion on the previous topics																					
Partial examination	10	✓	✓	✓	✓		✓	✓	✓		✓			✓				✓	✓	✓	
Introductory note on analysis of variance	11	✓			✓		✓	✓	✓					✓							
Data transformations	12	✓			✓		✓	✓	✓		✓	✓	✓	✓			✓				
One-way analysis of variance	13	✓			✓		✓	✓						✓			✓	✓	✓	✓	
Some basic experimental designs (completely random, randomized complet	14	✓	✓	✓	✓															✓	

e block and Latin square designs)																					
Two-way analysis of variance	15	✓					✓	✓	✓				✓	✓			✓	✓	✓	✓	
Split-plot experimental design	16	✓					✓	✓	✓				✓	✓						✓	
Least significant difference (LSD) and least significant range (LSR) tests	17	✓					✓						✓	✓			✓	✓	✓	✓	
Round-up discussion on the previous topics	18	✓					✓	✓	✓	✓	✓	✓	✓	✓						✓	
Partial examination	19	✓					✓			✓				✓						✓	
Simple linear regression	20	✓					✓			✓				✓						✓	
Simple linear correlati	21	✓							✓	✓				✓						✓	

on																					
Rank correlation	22						✓	✓	✓					✓						✓	
Curve fitting and method of least squares	23		✓								✓	✓	✓	✓						✓	
Multiple correlation	24	✓	✓	✓	✓		✓	✓	✓					✓			✓				
Multiple regression	25	✓						✓	✓					✓			✓				
Analysis of time series	26	✓	✓	✓	✓		✓	✓	✓					✓			✓	✓	✓	✓	
Round-up discussion on the previous topics	27	✓		✓	✓		✓							✓			✓	✓	✓	✓	
Round-up discussion on the all topics of the course (part one)	28	✓		✓				✓	✓					✓							
Round-up discussion on the all topics	29	✓		✓				✓					✓	✓							

of the course (part two)																					
Final examination	30	✓		✓	✓							✓	✓	✓						✓	
Section III																					
General principles	1	✓	✓	✓			✓	✓	✓						✓		✓	✓	✓	✓	
Biotic factors (positive and negative interactions)	2	✓	✓	✓			✓	✓	✓						✓		✓	✓	✓	✓	
Genetic factors (morphological characters and variation in phenotype alteration)	3	✓	✓	✓			✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	
The use of chromosome information in plant taxonomy	4	✓	✓	✓			✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	

Chromosome behavior in relation to plant taxonomy	5	✓					✓							✓	✓		✓	✓	✓	✓	
Chromosome banding pattern variation	6	✓					✓		✓			✓	✓							✓	
Pollen grain structure variation and taxonomy	7	✓					✓		✓			✓	✓							✓	
The use of some chemical compounds distribution in plant taxonomy	8	✓	✓	✓			✓		✓			✓		✓	✓		✓	✓	✓	✓	
The importance of DNA hybridization in plant taxonomy	9	✓	✓	✓			✓		✓			✓		✓						✓	
The use	1	✓		✓			✓		✓			✓		✓						✓	

of DNA contents in plant taxonomy	0																				
Importance of amino acid sequences in taxonomy	11	✓		✓								✓		✓	✓		✓	✓	✓	✓	
Characteristics of wildlife conservation (e.g. biodiversiy,)	12	✓		✓								✓	✓								
Species specification resulted from chromosome alteration	13	✓		✓								✓	✓	✓	✓		✓	✓	✓	✓	
Brief description of the Egyptian species evolution	14	✓		✓			✓	✓	✓			✓	✓							✓	
Assessment															✓						

Learning and Teaching Methods

Learing Method	Course outcomes ILOs																				
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Lecture	√	√	√	√	√	√	√													
Discussion (Brain Storming)																				
Self-learing (Essay)																				
Field Trips																				
Practical											√	√	√	√	√					

Assessment Methods

Assessment Methods	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√	√	√			√		√										
MCQ																				
Student Activity																				
Practical											√	√			√					
Assessment Methods																				

Course coordinator: Prof. Kamal Shaltout

Head of -- Department: Prof. Alaa Abou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Genetics

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014/2015, Two terms
Date of specification approval	08/2014

A- Basic Information

Title: **Computer**	Code: 1557
Tutorial:	Practical: 1
Total:	
Coordinator	**Prof. Mohamed El-Awady**
Other Staff	**Prof. Mahmoud Kamel, Prof. Ahmed El-Shishtawy, Prof. Qadry Zakaria**
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	**Lectures: 28 x 1h lectures** **Practical: 28 x 1h lectures**

B- Professional Information

3. **course aims:**

Develop students` capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.Develop Underpin academic work throughout postgraduate studies. Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

2. **Intended learning outcomes of course (ILOs)**

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-
A6. Recognize the diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies. Arrange powerful presentation using sophisticated software packages.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B1. Integrate different application programs to develop effective information analysis and presentation.

C2. Solve scientific problems using computer programming.

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-

a. Use a number of computer packages to present information.
b. Perform necessary graphical, statistical and frequency analyses of different types of data.
c. Use of different internet resources.
d. Use of different photo enhancing and manipulation techniques.

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-

D8. Internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Lectures 1-2	Methods for graphical representations, Data analysis and Data modeling
	Assignment 1 : **Using Application programs**
	Calculation of Slope and intersection of lines ,
	Best fitting for data,
	Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)
Lectures 3-5	Statistical Data analysis
	Assignment 2 : **Using Application programs**
	Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data
Lecture 6-7	Creating powerful presentation including charts, images, video, etc and different attractive animations

	Assignment 3 : **Using PowerPoint program**
	Design a real and powerful presentation with different acquired skills
Lecture 8-9	Use of internet capabilities and searching engines
	Assignment 4: Using the Internet
	Life search on the internet for some real information
Lecture 10-11	Creating Data Base and related Queries and Reports
	Assignment 5: Using Application programs
	Creating a real Data Base and apply different queries and reports to extract useful information
Lecture 12-13	Computer programming language
	Assignment 6: Programming using Visual Basic 6
	Solving real problems using a computer language
Lecture 14-15	Photo manipulation and enhancement using the photoshop
	Assignment 7: **Using the Photoshop program**
	Practicing on manipulation and enhancing of images
Lectures 16	Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities

4. Teaching and learning methods

e. Lectures	☒
f. Practical training / laboratory	☒
g. Seminar / Workshop	☐
h. Class Activity	-

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P

Semester work	to assess	-

Assessment schedule

Assessment 1	Practical exam	Week	15
Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	60	%
Practical Examination	40	%
Semester work	-	%
Total	100	%

6. List of references

Course notes

Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

Essential books (text books)

Recommended books

Web sites

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

Course coordinator:

Prof. Mohamed El-Awady

Head of Department:

Prof. Alaa Abou-Zeid

Date: 08/2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1557, **course title: Computer**

Course Contents		Knowledge and understanding					Intellectual					Practical					Tranferrable				
		A 1	A 2	A 3	A 4	A 5	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	C 5	D 1	D 2	D 3	D 4	D 5
Methods for graphical representations, Data analysis and Data modeling	1	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 1 : Using Application programs Calculation of Slope and intersection of lines , Best fitting for data,	2	✓					✓	✓				✓	✓	✓	✓		✓				

Extracting Trend , and Equations for acquired data (linear – exponential-logarithmic ….etc)																					
Statistical Data analysis	3	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 2 : Using Application programs Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data	4	✓					✓	✓				✓	✓	✓	✓		✓				
Creating powerful presentation including	5	✓					✓	✓				✓	✓	✓	✓		✓				

charts, images, video, etc and different attractive animations																					
Assignment 3 : **Using PowerPoint program** Design a real and powerful presentation with different acquired skills	6	✓					✓	✓				✓	✓	✓	✓		✓				
Use of internet capabilities and searching engines	7	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 4: Using the Internet Life search on the internet	8	✓					✓	✓				✓	✓	✓	✓		✓				

for some real information																					
Creating Data Base and related Queries and Reports	9	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 5: Using Application programs Creating a real Data Base and apply different queries and reports to extract useful information	10	✓					✓	✓				✓	✓	✓	✓		✓				
Computer programming language	11	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 6: Programming	12	✓					✓	✓				✓			✓		✓				

using Visual Basic 6 Solving real problems using a computer language																					
Photo manipulation and enhancement using the photoshop	13	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 7: Using the Photoshop program Practicing on manipulation and enhancing of images	14	✓					✓	✓				✓	✓	✓	✓		✓				
Introduction to Data frequency analysis using Fourier analysis	15	✓					✓	✓				✓	✓	✓	✓		✓				

and Fourier transformation searching for periodicities																				
Assessment																				

Learning and Teaching Methods

Learing Method		Course outcomes ILOs																		
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Lecture	√	√	√	√	√		√	√		√										
Discussion (Brain Storming)																				
Self-learing (Essay)																				
Field Trips																				
Practical											√	√	√	√	√					

ssessment Methods

Assessment Methods		Course outcomes ILOs																		
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Essay Question	√	√	√	√	√		√													
Practical											√		√		√					

Course coordinator: Prof. Mohamed El-Awady

Head of -- Department: Prof. Alaa Abou-Zeid

M.Sc. Programme
of
Phycology

Tanta University, Faculty of Science

M. Sc. program specifications of Phycology

Department offering the program	Botany Department
Academic year	2014-2015
Date of specification approval	8 /2014

A- Basic Information

Program title:	M. Sc. degree in Botany (Phycology)
Program type	Single
Coordinator:	Prof. Atef Abo-Shady
External Evaluator (s):	Prof. Hanan A. Gozlan. Faculty of Science, Alexandria University
QAA Benchmarking Standards	Academic Reference Standards (ARS)
Program References	Bioscience, Egyptian Code of Assessment
Date of Delivery	Every year in September
Review Date	Internal Periodic Review, Summer 2014

B- Professional Information

1-Program aims

It is aimed to provide students comprehensive concepts of plant phycology and in-depth understanding of specialized areas of special topics related to plant phycology and plant biochemistry. Equip students with IT and statistical skills to present, edit and analysis their data. Prepare the students to the doctor program (Ph.D.) in the field of Phycology or to the professional employment.

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should have acquired knowledge and understanding of the underlying concepts and principles of:

A1. Classify algae and relate each to order and family

A2. physiology of algae and microorganisms in general

A3. membrane and pigment structure, in addition to the basic biochemistry of Protein and DNA.

A4. basic statistical procedures used to analyze data

B. Intellectual skills:

At the end of this module students should have acquired the ability to :

B1. Think logically and organize tasks into a structured form.

B2. Assimilate knowledge and ideas based on wide reading and through the internet.

B3. Understand the evolving state of knowledge in a rapidly developing field.

B4. comment on technique used in algae classification

B5. interpret different techniques in extraction of economic products from algae.

B6. Plan, conduct and write a report on an independent research project

C. Professional and practical skills

At the end of this module students should have acquired the following skills:

C1. Conduct basic techniques and methods to the studies and research in algae classification and physiology.

C2. Be able to prepare written protocols for experimental procedures and collect and interpret data from experimental observations and measurements

C3. Be able to design and conduct individual and shared research projects both in the laboratory and in the field.

C4. Be able to use computer software and web sites and other forms of information technology for data collection, analysis and presentations

D. General and transferable skills:

D1. Work in a team and be able to cooperate with others

D2. Demonstrate written and verbal communication skills using IT in work and in life

D3. Able to accounting and management.

D4. Ability to manage time and resources

D5. Present ideas and arguments in a structured manner

E. Teaching and learning

Knowledge will be developed through

1. Lectures

2. Practical

E. Assessment

A wide variety of assessment methods are used

1. Written exam.

2. Practical exam.

3. Academic Reference Standards:

The Academic Reference Standards for the award of master in Plant phycology (Algae) As well as the attributes and capabilities of the graduate To Provide students with the main concepts of classification of Algae, teach and train students the principles and main physiological processes in algae and microorganisms in general., understand the basic biochemistry of membrane, pigments, protein and DNA and to know the basic statistical procedures used to analyze data

I. Knowledge and Understanding:

Approaches to study and forms of subject knowledge likely to be common to all bioscience degree programs will include the following:

- **knowledge and understanding of the processes and mechanisms of life**
- **From molecular to cellular.**
- **From Organism to community.**
- **engagement with the essential facts, major concepts, principles and theories associated with the chosen discipline.**
- **understanding of information and data, and their setting within a theoretical framework.**
- **familiarity with the:**
- **Terminology.**
- **Nomenclature.**
- **Classification systems as appropriate.**
- **Methods of acquiring, interpreting and analysing biological. information with a critical understanding of the appropriate contexts for their use through the:**
- **Study of texts.**
- **Original papers.**

- **Reports and data sets.**
- **Developing knowledge about the diversity of life and its evolution.**
- **Knowledge of a range of practical techniques and methodologies, including :**
- **Data analysis.**
- **Use of statistics.**
- **Engagement with current developments in the biosciences and their applications, and the philosophical and ethical issues involved.**
- **The applicability of the biosciences to the careers to which graduates will be progressing.**

II. Skills

A. Generic skills

- **an appreciation of the complexity and diversity of life processes through the study of organisms, their molecular, cellular and physiological processes, their genetics and evolution, and the interrelationships between them and their environment.**
- **the ability to read and use appropriate literature with a full and critical understanding.**
- **the capacity to give a clear and accurate account of a subject.**
- **critical and analytical skills: a recognition that statements. Should be tested and that evidence is subject to assessment and critical evaluation.**
- **the ability to employ a variety of methods of study in investigating, recording and analyzing material.**
- **the ability to think independent, set tasks and solve problems.**

A. Key skills

The specific key skills that should be developed in bioscience degree courses are subdivided into:-

1. Intellectual skills

- **Recognizing and applying subject-specific theories, concepts or principles. For example:**
- **The relationship between genes and proteins.**
- **The nature of essential nutrients in microbes, cells, plants and animals;**
- **Analyzing and summarizing information critically, including published research or reports;**

• Obtaining and integrating several lines of subject-specific evidence to formulate and test hypotheses;

• Applying subject knowledge and understanding to address familiar and unfamiliar problems

2. Practical skills

• Designing, planning, conducting and reporting on investigations. The data may be obtained through:

• individual

• group projects

• Obtaining, recording, collecting and analyzing data using appropriate techniques in the field and/or laboratory, working by themselves or in a group

• Undertaking field and/or laboratory investigations of living systems in a responsible, safe and ethical manner. For example, Students must pay due attention to risk assessment, relevant health and safety regulations, and respect for animal & plant life

• In some Bioscience degrees, graduates will learn to respect rights of access, for example:-

- In field work or in order to map the genes of a community, family or group of plants or animals, including humans. They should show sensitivity to the impact of investigations on:

- the environment.

- the organisms under investigation.

- other stakeholders.

• Preparing, processing, interpreting and presenting data, using appropriate qualitative and quantitative techniques:

- Statistical programs.

- Spreadsheets.

- Programs for presenting data visually.

• Solving problems by a variety of methods including the use of computers.

• Using the internet and other electronic sources critically as a means of communication and a source of information.

3. Interpersonal and teamwork skills

• Identifying individual and collective goals and responsibilities and performing in a manner appropriate to these roles;

- **Recognizing and respecting the views and opinions of other team members;**
- **Negotiating skills;**
- **Evaluating performance as an individual and a team member; evaluating the performance of others;**
- **Developing an appreciation of the interdisciplinary nature of science and of the validity of different points of view.**

4. Self-management and professional development skills

- **Developing the skills necessary for self-managed and lifelong learning (e.g. working independent, time management and organization skills);**
- **Identifying and working towards targets for personal, academic and career development;**
- **Developing an adaptable, flexible, and effective approach to study and work.**

4.a.Program duration: Minimum two years.

4.b.Program Structure:

4. b.1. The First Preliminary Year:

All applicants admitted to the master's program are required to study 6 selected theoretical courses and one practical course approved by the department council from the master courses offered by the department for one academic year. A part of the M.Sc. courses offered by the Botany Department, the student should study a course in English language for a minimum one hour per week. Albeit, students who have taken equivalent English language course may be exampled from it upon the recommendation of the Faculty Council.

No. of hours per week: 12 Lectures and 6 hours practical

The registration for the preliminary year takes place in October, and the final exam. Is held once a year (June) in the date approved by the Faculty Council.

Grade Assessment:

Final Written Exam.60%

Final Practical Exam 40%

*< 60% failed

60-69 passed, 70-79 good, 80-89 very good, >90% excellent

*Failed students can repeat the course (s) only once.

4. b.2. The second year:

If the student passes the final examination, he/she will be a legible for continuation and registration to carry out research and starts thesis preparation. The thesis could be submitted after one year.

5. Program Contents

N	Code	Course Name	Lecturer
1	1531	Phycology	Prof. Dr. Atef Abo-Shady Dr. Gehan Ismail Dr. Sally Gheda Dr. Shimaa El-Shafey
2	1532	Biochemistry A	Prof. Dr. Mohamed El-Anowr Prof. Dr. Awatif Mohsen
3	1533	Biochemistry B	Prof. Dr. Mohammed El-Shourbagy Prof. Dr. ElsayedMorsi
4	1534	Physiology of Algae and Microorganisms	Prof. Dr. Atef Abo-Shady, Dr. SamiaShabana
5	1538	Biostatistics	Prof. Dr. Kamal Shaltout Dr. Mohamed Abdelmonsef
6	1573	Computer	Prof. Dr. Mohamed El-Awady.

Course Contents of plant Phycology

Course Name	Code No	Contents
Phycology	1531	The criteria of classification of algae depending on the photosynthetic pigments, food storage, chemical structures of cell wall, evolution of thallus, evolution of sex organs and flagella, fine structure of algal plastids, biochemical taxonomy of algae based on pigments, lipids and carbohydrates.
Biochemistry A	1532	Types and, mechanisms of phosphorylation, Plant pigments: structure, function and biosynthesis, Biological membranes: structure, function and biosynthesis,

		Importance of natural plant products, Definition, importance and biosynthesis of alkaloids, terpenoides and phenolic compounds
Biochemistry B	1533	Growth and differentiation in plants, Plant growth hormones and their metabolism, Mechanism of action of plant growth hormones, Hormonal control in the whole plant, Molecular mechanisms of plants under stress, Perception and transduction of stress by plant cells, Synthesis of phenolic compounds and metabolic lipids in chloroplasts
Physiology of Algae and Microorganisms	1534	Physiology of algae: Effect of environmental conditions on the algal growth and metabolicativity, Nitrogen fixation: nitrogenases, reductant and ATP, factors affecting nitrogen fixation, regulation of nitrogen, and The role of algae in economical potential, water pollution. Physiology of Microorganisms: Spore germination, Heat shock protein in fungi, Growth rhythms, Fungi as decomposers of leaves, Effect of the toxic environment on microbial growth, The role of cyanobacteria in nitrogen fixation
Biostatistics	1538	Part one: Statistical definitions, sampling of attributes, distributions (Normal, Binomial, Poisson), and tests of significance, Part two: Analysis of variance, experimental designs, association between variables, curve fitting and the method of least square, multiple and partial correlation and regressions, and analysis of time series.
Computer	1573	Visual basic, power point, internet and Photoshop program

6.Thesis

Thesis is an essential aspect of M.Sc. program, for partial fulfillment of M.Sc. degree requirements. It is a formal written document representing sustained original research into an important intellectual issue. The thesis must be an independent effort which contributes to the accumulated understanding of the field in which it is written. The required research preparation and advanced research methods will help the student to focus his or her research effort, and provide general guidelines for research approach and report preparation. Thesis must meet precise academic standards and will be reviewed and approved by the candidate's supervising professor and external academic review committee.

The thesis should contain at least the following:

• Title page (title, name of student, university, faculty, name of program, date, supervisors

• Table of contents
• Introduction, containing a definition of the thesis statement, working method, the theoretical framework, and the aim.
• Literature review.
• Materials and methods.
• Results
• Discussion and conclusions
• References.

Language of the thesis

The thesis must be written in English language accompanied by a summary in Arabic.

Formation of Examiners Committees

A committee is selected by Botany Department Council. The M.Sc. Degree is awarded to the applicant by University, upon the recommendation of the department and the Faculty Council.

7-Admission:

An applicant for admission to the master's program should hold Botany B.Sc. degree in science either major with a minimum grade "Good" or double major with a minimum general grade "Good" from any Egyptian or equivalent institute. In addition, all applicants must satisfy the department graduate admission.

8- Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1 Alumni	Questionnaire	
2- Stakeholders (Employers)	Questionnaire	
3- External Evaluator(s)	Report	

Program coordinator:

Prof. Atef Abo-Shady

Head of Department:

Prof. AlaaAbou-Zeid

Date: 8/ 2014

M. Sc. programPlant (Phycology) matrix

Course Title	Course code	M. Sc. program(Phycology) matrix																							
		Knowledge and Understanding					Intellectual skills								Professional skills					General skills					
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	B8	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6
Phycology	1531	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√
Biochemistry A	1532				√	√	√			√	√			√	√		√		√			√		√	
Biochemistry B	1533	√			√	√	√			√				√			√	√		√	√		√	√	√
Physiology of Algae and Microorganisms	1534	√	√	√	√	√	√	√	√	√	√	√	√	√	√			√		√	√	√	√	√	√
Biostatistics	1538				√	√	√	√				√	√	√		√	√					√			√
Computer	1573				√	√			√	√		√	√		√			√	√						√
thesis					√	√	√	√	√	√	√	√		√	√	√	√	√	√	√		√	√	√	√

Coordinator: Prof. Atef Abo-Shady

Head of Department: Prof. Alaa Abo-Zeid

M. Sc. Course specifications of Phycology

A- Basic Information

Title: Phycology	Code: 1531
Coordinator	Prof. Atef Abo-Shady
Other Staff	Dr. AbdelfatahAbomohra
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	14 x 2h lectures (First term)
	14 x 2h lectures (Second term)

Academic Year : 2014-2015

B- Professional Information

course aims:

Explore the fundamental principles of algal classification depending on the photosynthetic pigments, food storage, chemical structures of cell wall, and evolution of thallus, evolution of sex organs and flagella, fine structure of algal plastids, biochemical taxonomy of algae based on pigments, lipids and carbohydrates.Provide the students with an understanding of the basic principles of algal physiology.Teach the students of phycology section the basic principles of algal culture techniques. b Identify the algal uses and economics

2. Intended learning outcomes of course (ILOs)

A-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A.1- List the general characteristics of algae.

A.2- Recognize the bases of algal classification.

A.3. Define the factors affecting the distribution of Algae of Rivers and lakes.

A.4- Explain the effect of algal toxins on animals and humans.

B- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B1. Formulate the principles, underlying algal metabolism.

B2. Assess the principles underlying the different nutrients metabolic regulatory circuits.

B3. Discuss the basis of algal toxins and their effect.

B4. Interpret the effect of nutrients on algae growth and metabolism.

C- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-   C1. Use different methods for algae laboratory manipulation.   C2. Use statistics to evaluate the efficiency of different methods used in that field.   C3. Manage strategy for algae metabolism identification   C4. Carry out laboratory work

D- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-   D1. Use of statistical packages for cluster analysis   D2. Prepare a research proposal   D3. Prosecute a research by applications of laboratory or field techniques   D4. Communicate the principles of algal physiology in a manner appropriate to their programme of study.

3. Contents
A. Theoritical

First Semester	
Week	**Topic**
1	What are algae?
2	Bases of algae classification
3	Factors affecting algae distribution
4	Algae and the food they make
5	Algae of streams and rivers
6	How algae grow and reproduce
7	Reproduction units in algae
8	Algae of Lakes and ponds
9	Effect of light on the distribution of algae in Lakes and ponds
10	Effect of nutrients on algae distribution
11	Different life cycles in algae

12	Toxic algae
13	Molecular taxonomy of algae
14	Assessment
Second Term	
Week	**Topic**
1	Effect of environmental conditions on the algal growth and metabolicativity
2	Growth requirements of algae
3	Phosphate starvation, phosphorus and phosphate content in water
4	Nitrogen assimilation and protein synthesis
5	Enzymology of nitrate reduction
6	Nitrogen fixation: nitrogenases, reductant and ATP, factors affecting nitrogen fixation, regulation of nitrogen
7	The role of algae in economical potential
8	Algae and water pollution
9	Algae as source of byproducts such as antimicrobial substances, vitamins, food and as indicator for pollution.
10	Genetic engineering of algae
11	Transformation of algae
12	*Spirulina* the edible alga
13	Production of *Spirulina*
14	Assessment

4. **Teaching and learning methods**

   a. Lectures ☒
   b. Practical training / laboratory ☒
   c. Seminar / Workshop ☐
   d. Class Activity -

5. **Student assessment methods**

Written final exam	to assess	KU, I
Practical	to assess	KU, I , P

Assessment schedule

Assessment 1	Practical exam	Week	15
Assessment 2	Final exam	Week	16

Weighting of assessments

Final-term Examination	60	%
Practical Examination	40	%
Total	100	%

6. List of references

Essential books (text books)

- Algal Ecology, Freshwater benthic ecosystems, Edited by Stevenson, R.J., Bothwell, M.L., Lowe R.L. Academic Press (1996)
- Algal culturing techniques, Edit Anderson, R.A., Elsivier (2005)
- Algal Physiology and Biochemistry
- The Algae edited by Chapman
- Algae and human affairs Edited by CuroleA.Lembi

Recommended books

- Algae: Anatomy, Biochemistry, and Biotechnology by Barsanti, L. &Gualtieri, P.

Web sites

- www. Algaebase.com
- http://www.ucmp.berkeley.edu/greenalgae/greenalgae.html
- http://www.microscopy-uk.org.uk/index.html?http://www.microscopy-uk.org.uk/pond/algae.html
- http://www.life.umd.edu/labs/delwiche/Charophyte.html
- http://www.dnr.state.md.us/Bay/hab/
- http://www.paleoweb.net/algae/

7. Facilities required for teaching and learning

- Generic resources, such as the library.
- Electronic copies of past exam papers and example assessments.
- Computer Aided, such as E-mail, online conference, data show.
- Course web page, Digital camera for images collections as a tool for active

learning

Course coordinator:

Prof. Atef Abo-Shady

Head of Department:

Prof. AlaaAbou-Zeid

Date: 8 /2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1531, Course title: Phycology

Weeks	Course content/ Theoritical	**Practical**	Knowledge andunderstanding				Intellectual skills				Practical skills				Transferable skills			
			A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	C 1	C 2	C 3	C 4	D 1	D 2	D 3	D 4
First semester																		
1	What are algae		√	√						√			√	√			√	√
1																		
2	Bases of algae classification		√	√						√	√			√			√	√
2																		
3	Factors affecting algae distribution		√	√						√		√					√	√
4	Algae and the food they make		√	√						√			√				√	√
5	Algae of streams and rivers		√	√	√	√	√	√				√		√	√			√
6	How algae grow		√					√							√			√

	and reproduce																	
7	Reproduction units in algae		√					√	√	√					√			√
8	Algae of Lakes and ponds		√	√	√			√	√	√	√	√						√
9	Effect of light on the distribution of algae in Lakes and ponds							√	√	√				√		√	√	√
10	Effect of nutrients on algae distribution		√									√			√	√	√	√
11	Different life cycles in algae		√	√													√	√
12	Toxic algae		√	√				√	√	√		√					√	√
13	Molecular taxonomy of algae		√	√				√	√	√							√	√
14	Assessment		√	√				√	√	√		√		√			√	√

Second semester																		
1	Effect of environmental conditions on the algal growth and metabolicativity		√	√				√	√	√								√
2	Growth requirements of algae		√	√	√	√	√					√		√		√	√	√
3	Phosphate starvation, phosphorus and phosphate content in water		√						√	√				√				
4	Nitrogen assimilation and protein synthesis		√						√	√			√					
5	Enzymology of nitrate reduction		√						√	√		√					√	√
6	Nitrogen fixation		√	√	√	√							√	√			√	√

	: nitrogenases, reductant and ATP, factors affecting nitrogen fixation, regulation of nitrogen																	
7	The role of algae in economical potential		√										√		√			√
8	Algae and water pollution		√												√			√
9	Algae as source of byproducts such as antimicrobial substances, vitamins, food and as indicator for pollution.		√										√		√			√

10	Genetic engineering of algae					√						√		√				
11	Transformation of algae					√								√				
12	Spirulina the edible alga					√					√							
13	Production of Spirulina					√					√			√				
14	Assessment		√	√	√	√	√	√	√						√	√	√	√

Learning and Teaching Methods

LearingMethod	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
Lecture	√	√	√	√	√	√										
Practical			√	√				√	√	√	√	√				

Assessment Methods

AssessmentMethods	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
Essay Question	√	√	√	√		√	√									
Practical	√	√			√	√			√							

Course Coordinator: Prof. Atef Abo-Shady

Head of Botany Department: Prof. AlaaAbou-Zeid

TantaUniversity, Faculty of Science

M. Sc. Course specifications of Phycology

A- Basic Information

Title: Biochemistry A	Code: 1532
Coordinator	Prof. Dr. Mohamed El-Anwer
Other Staff	Prof. Dr. Awatif A. Mohsen; Prof. Dr. SayedMorsy
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	14 x 2h lectures (First term) 14 x 2h lectures (Second term)

Academic Year :2014-2015

B- Professional Information

Course aims:

Explore the fundamental principles of plant biochemistry and the mutual response of cell activity with the enzymes and other growth regulator. Teach the students the unusual growth and metabolism of algae under the different stress conditions

2. Intended learning outcomes of course (ILOs)

A-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1- Identify the biochemical processes of the plant cells

A2- Discuss the role of plant growth regulators in plant metabolism

A3- Explain the effect of stresses on the plant metabolism.

B- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B1. Critically evaluate the information from a variety of sources

B2. Demonstrate the principles of plant biochemistry in a manner suitable to their programme of study.

B3. Discuss the principles, underlying plant metabolism.

B4. Distinguish the principles underlying the different stresses metabolic regulatory circuits.

C- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-
C1. Use different methods for biochemistry laboratory manipulation. C2. Use statistical to evaluate the efficiency of different methods used in that field. C3. Carry out laboratory work

D- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-
D1. Prepare complete and clear scientific report D2. Work with others, use and manage ideas and information prepare of a research proposal D3. Prosecute of research by applications of laboratory or field techniques

3. Contents

First Part	
Week	**Topic**
1	Pigments of photosynthesis, chlorophyll pigments
2	Carotenoids
3	Phycobiliproteins
4	Comopsition of cell membrane
5	Phospholipids
6	Glycolipids
7	Sulfolipids
8	Other lipids
9	Proteins
10	Structure of cell membranes
11	Interaction of lipids and proteins
12	Molecular architecture of membrane
13	Biosynthesis and assembly of cell membranes
14	Selected papers in the topic of plant physiology
Second Part	
Week	**Topic**

1	Glutamine synthetase in higher plants
2	Spatial distribution of glutamine synthetase
3	Regulation of glutamine synthetase
4	Genetic manipulation of glutamine synthetase
5	The glycine decarboxylase complex, structure, function and biothynthesis
6	Glycine decarboxylation and photorespiratory metabolism in C3 plants
7	Metabolic control of glycine
8	Organ and cellular distribution of glycine
9	Glycine decarboxylation in C3-C4 and CAM plants
10	The gene encoding in glycine cleavage complex
11	Glycine serine synthesis in non photosynthetic tissue
12	Processes involved in glutathione metabolism
13	Glutathione degradation
14	Membrane transport of glutathione
Third Part	
Week	**Topic**
1	Effect of environmental conditions on the growth hormones
2	Growth requirements of hormones
3	The role of ABA
4	Theories of ABA origin and metabolism
5	Carotenoids origin of ABA
6	Response of ABA function to its structure
7	The role of environments in the metabolism of nitrogenous compounds
8	How proline was discover in stress plants
9	Proline metabolism
10	Function of proline in the different stresses
11	Proline and important enzymes

12	Glycine betainebiothynthesis
13	Fuction of glycine betaine during stress
14	The role of other betaine
15	Other nitrogenous compounds

4. Teaching and learning methods

1. Lectures ☒
2. Practical training / laboratory ☒
3. Seminar / Workshop ☐
4. Class Activity -

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	KU, I , P

Assessment schedule

Assessment 1	Practical exam	Week	15
Assessment 2	Final exam	Week	16

Weighting of assessments

Final-term Examination	60	%
Practical Examination	40	%
Total	100	%

6. List of references

Recommended textbooks

- Plant Physiology and Biochemistry by Dr. P. Prasad 2007

Web sites

- http://www.google.com
- http://www.ucmp.berkeley.edu/greenalgae/greenalgae.html
- http://www.life.umd.edu/labs/delwiche/Charophyte.html
- http://www.dnr.state.md.us/Bay/hab/
- http://www.paleoweb.net/algae/

7. Facilities required for teaching and learning

- Generic resources, such as the library.
- Electronic copies of past exam papers and example assessments.
- Computer Aided, such as E-mail, online conference, data show.
- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

Prof. Dr. Mohamed El-Anwer

Head of Department:

Prof. AlaaAbou-Zeid

Date: 8/2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1532					**Course title:** Biochemistry A									
Weeks	Titles	Knowledge and understanding			Intellectual skills				Practical skills			Transferable skills		
		A 1	A 2	A 3	B 1	B 2	B 3	B 4	C 1	C 2	C 3	D 1	D 2	D 3
1	Pigments of photosynthesis, chlorophyll pigments	√	√	√	√	√	√					√		
2	Carotenoids	√										√		
3	Phycobiliproteins	√										√		
4	Comopsition of cell membrane	√										√		
5	Phospholipids	√										√		
6	Glycolipids	√										√		
7	Sulfolipids	√										√	√	√
8	Other lipids	√										√		√
9	Proteins	√	√			√	√	√	√	√	√	√		√
10	Structure of cell membranes	√	√			√	√	√				√		√
11	Interaction of lipids and proteins	√	√			√	√	√				√	√	√
12	Molecular architecture of membrane	√				√	√			√				√
13	Biosynthesis and assembly of cell membranes	√				√	√	√	√	√				√
14	Selected papers in the topic of plant physiology	√	√				√	√	√	√	√	√		
15	Glutamine synthetase in	√	√				√	√	√		√	√		

	higher plants													
16	Spatial distribution of glutamine synthetase	√	√				√	√	√		√	√		
17	Regulation of glutamine synthetase	√	√				√	√	√		√	√		
18	Genetic manipulation of glutamine synthetase	√	√			√	√	√	√	√	√	√	√	√
19	The glycine decarboxylase complex, structure, function and biothynthesis	√	√			√	√	√				√	√	√
20	Glycine decarboxylation and photorespiratory metabolism in C3 plants	√	√			√	√	√				√	√	√
21	Metabolic control of glycine	√	√			√	√	√				√	√	√
22	Organ and cellular distribution of glycine			√								√		
23	Glycine decarboxylatioin C3-C4 and CAM plants			√					√	√	√	√		
24	The gene encoding in glycine cleavage complex			√	√	√	√							
25	Glycine serine synthesis in non photosynthetic tissue			√	√	√	√						√	√
26	Processes involved in glutathione metabolism	√					√	√	√			√	√	√

27	Glutathione degradation	√					√	√	√			√	√	√
28	Membrane transport of glutathione	√					√	√	√			√	√	√
29	Effect of environmental conditions on the growth hormones	√					√	√	√			√		
30	Growth requirements of hormones	√					√		√			√		
31	The role of ABA	√			√					√	√	√		
32	Theories of ABA origin and metabolism	√			√	√								
33	Carotenoids origin of ABA	√			√	√								
34	Response of ABA function to its structure	√		√	√	√							√	√
35	The role of environments in the metabolism of nitrogenous compounds	√		√			√	√	√	√	√	√	√	√
36	How proline was discover in stress plants	√	√	√			√	√	√	√	√	√		
37	Proline metabolism			√						√	√	√		
38	Function of proline in the different stresses			√	√	√				√	√	√		
39	Proline and important enzymes			√	√	√				√				
40	Glycine betainebiothynthesis	√			√	√								√
41	Fuction of glycine betaine during	√			√	√		√	√				√	√

	stress													

LearingMethod	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3		B1	B2	B3	B4	C1	C2	C3		D1	D2	D3	
Lecture	√	√	√		√	√										
Discussion (Brain Storming)																
Self-learing (Essay)																
Field Trips																
Practical			√		√				√	√	√					

42	The role of other betaine	√			√	√		√	√				√	√
43	Other nitrogenous compounds	√	√					√	√				√	√

Learning and Teaching Methods

Assessment Methods

AssessmentMethods	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3		B1	B2	B3	B4	C1	C2	C3		D1	D2	D3	
Essay Question	√	√				√										

AssessmentMethods	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3		B1	B2	B3	B4	C1	C2	C3		D1	D2	D3	
Practical	√	√			√	√			√	√						

Course Coordinator: Prof. Dr. Mohamed El-Anwer

Head of Botany Department:Prof. AlaaAbou-Zeid

TantaUniversity, Faculty of Science

M. Sc. Course specifications of Phycology

A- Basic Information

Title: Biochemistry B	Code: 1533
Coordinator	Prof. Mohamed N. El-Shourbagy
Other Staff	Prof. Dr. ElsayedMorsi
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	14 x 1h lectures (First term) 14 x 1h lectures (Second term)

Academic Year :2014-2015

B- Professional Information

1. Course aims:

Extend fundamental concepts and principles of biological knowledge in recent topics of biochemistry of secondary metabolites in the plant cell. Introduce the molecular basis of stress plant physiology.Review the molecular mechanisms of the stress signals and response.Teach the structure of nucleic acids and the flow of genetic information in the cell.

2. Intended learning outcomes of course (ILOs)

A-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1- Demonstrate an understanding of molecular biology and molecular genetics

A2- Demonstrate knowledge of biochemical pathways of the secondary metabolites in plant cell

A3- Demonstrate knowledge of response of the plant cell to stress

A4- Understand the molecular mechanisms of scavenging pathways

A5- Understand and exchange of knowledge via the internet

A6- Demonstrate ability to use knowledge using pc software

B- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B1. Critically evaluate the primary literature in plant biochemistry.

B2. Demonstrate the principles of plant biochemistry in a manner appropriate to

the study of algae. B3. Discuss the principles, underlying secondary metabolites, recombinant DNA and gene technology. B4. Distinguish the principles underlying biotic stress.

C- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-
C1. Use different methods for biochemistry laboratory manipulation. C2. Use statistical to evaluate the efficiency of different methods used in that field. C3. Carry out laboratory work

D- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-
D.1 Use of the Internet sites to access information and prepare a research proposal D.2 Prosecute a research by applications of laboratory or field techniques D.3 Demonstrate written and verbal communication skills D.4 Use of databases and library search methods

3. Contents

First partNucleic acids and related topics	
Week	**Topic**
1	The function of secondary metabolites
2	Secondary metabolites in chemosystematics
3	classification of secondary metabolites
4	Terpenoids: biosynthesis
5	Terpenoids: classification
6	Function of terpenoids and steroids in plants
7	Phenols: biosynthesis
8	Mid term exam

9	Catabolism
10	Phenolic acids and coumarins
11	Alkaloids: biosynthesis
12	Function of alkaloids
13	Porphyrins, purins and pyrimidines: biosynthesis & catabolism
14	Final exam
Second Part	
Week	**Topic**
1	Introduction on stress physiology
2	Perception, transduction and signaling pathways of stress
3	Oxidative stress as a common feature of stress
4	Oxidative stress as a regulator of environmental response
5	Sources of free radicals in plant cell
6	Oxidative stress in plant pathogen relationship
7	Oxidative stress and programmed cell death
8	Mid term exam
9	Mechanism of defense and phytotoxicity to oxidative stress
10	Physiological adaptation and response to oxidative damage
11	Free radical scavenging pathways
12	Antioxidant enzymes and molecules
13	Mechanism of ascorbate glutathione cycle
14	Discussion of some selected papers on the course topics

4. Teaching and learning methods

a. Lectures ☒
b. Practical training / laboratory ☒
c. Seminar / Workshop ☐
d. Class Activity -

5. Student assessment methods

Written final exam	to assess	KU,I
Practical	to assess	KU, I ,P

Assessment schedule

Assessment 1	Practical exam	Week	15
Assessment 2	Final exam	Week	16

Weighting of assessments

Final-term Examination	60	%
Practical Examination	40	%
Total	100	%

6. List of references

Essential books (text books)

- Algal Ecology, Freshwater benthic ecosystems, Edited by Stevenson, R.J., Bothwell, M.L., Lowe R.L. Academic Press (1996)
- Algal culturing techniques, Edit Anderson, R.A., Elsivier (2005)
- Physiology and Biochemistry
- The Algae edited by Chapman
- Algae and human affairs Edited by Curole A.Lembi

Web sites

- http://www.emc.maricopa.edu/faculty/farabee/biobk/BioBookDNAMOLGEN.html
- http://www.learn4good.com/bookstore/genetics_books_cds_for_academic_students.htm Sites of publishers of science books and periodicals, e.g.. Springer Verlag, Academic press, Oxford John Wiley and sons. .etc.…

7. Facilities required for teaching and learning

- Generic resources, such as the library.
- Electronic copies of past exam papers and example assessments.
- - Computer Aided, such as E-mail, online conference, data show.
- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

Prof. Mohamed N. El-Shourbagy

Head of Department:

Prof. AlaaAbou-Zeid

Date:08/2014

TantaUniversity, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1532		**Course title:** Biochemistry B												
Weeks	Titles	Knowledge and understanding			Intellectual skills				Practical skills			Transferable skills		
		A1	A2	A3	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3
1	Pigments of photosynthesis, chlorophyll pigments	√	√	√			√	√		√				
2	Carotenoids	√	√	√			√	√		√				
3	Phycobiliproteins	√	√	√			√	√		√				
4	Comopsition of cell membrane			√			√	√		√				
5	Phospholipids			√	√	√	√	√	√	√				
6	Glycolipids			√					√				√	√
7	Sulfolipids			√					√				√	√
8	Other lipids	√	√	√					√				√	
9	Proteins	√	√			√	√	√	√				√	

10	Structure of cell membranes	√	√			√	√	√	√				√	
11	Interaction of lipids and proteins	√	√			√	√	√	√				√	
12	Molecular architecture of membrane	√	√	√				√	√				√	√
13	Biosynthesis and assembly of cell membranes	√	√		√	√	√				√			√
14	Selected papers in the topic of plant physiology	√	√		√	√	√				√			√
15	Glutamine synthetase in higher plants	√	√								√			√
16	Spatial distribution of glutamine synthetase	√	√		√	√	√	√	√	√	√			√
17	Regulation of glutamine synthetase	√			√	√					√	√	√	√

18	Genetic manipulation of glutamine synthetase	√			√	√					√			
19	The glycine decarboxylase complex, structure, function and biothynthesis	√			√	√					√			
20	Glycine decarboxylation and photorespiratory metabolism in C3 plants	√			√			√	√	√	√			
21	Metabolic control of glycine	√	√			√	√				√			
22	Organ and cellular distribution of glycine	√	√			√	√				√			√
23	Glycine decarboxylatioin C3-C4 and CAM plants		√			√	√				√			√

24	The gene encoding in glycine cleavage complex		√			√	√	√	√	√	√			√
25	Glycine serine synthesis in non photosynthetic tissue	√	√	√	√					√	√	√	√	√
26	Processes involved in glutathione metabolism				√	√	√			√	√			
27	Glutathione degradation				√	√	√			√	√			
28	Membrane transport of glutathione				√	√	√			√	√			
29	Effect of environmental conditions on the growth hormones				√					√	√			
30	Growth requirements of hormones	√	√	√		√	√			√	√			√

31	The role of ABA			√		√	√			√	√			√
32	Theories of ABA origin and metabolism			√		√	√			√	√			√
33	Carotenoids origin of ABA			√							√			√
34	Response of ABA function to its structure			√	√						√	√	√	√
35	The role of environments in the metabolism of nitrogenous compounds	√	√	√	√	√			√	√				√
36	How proline was discover in stress plants	√				√			√	√				√
37	Proline metabolism	√				√			√	√				√
38	Function of proline in the different stresses	√				√			√	√				√

39	Proline and important enzymes	√				√	√	√	√	√				√
40	Glycine betainebiothynthesis			√	√	√	√	√	√	√	√			√
41	Fuction of glycine betaine during stress			√	√					√	√			√
42	The role of other betaine			√	√					√	√			√
43	Other nitrogenous compounds	√			√					√				√

Learning and Teaching Methods

ringMethod	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills				General and Transferable Ski			
	A1	A2	A3		B1	B2	B3	B4	C1	C2	C3		D1	D2	D3	
Lecture	√	√	√		√	√										
Discussion (Brain Storming)																
elf-learing (Essay)																

Field Trips																
Practical			√				√		√	√	√					

Assessment Methods

essmentMethods	Course outcomes ILOs															
	Knowledge and Understanding				Intellectual Skills				Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3		B1	B2	B3	B4	C1	C2	C3		D1	D2	D3	
ay Question	√	√	√			√										
Q																
dent Activity																
actical	√	√			√	√			√	√						
sessmentMethods																

Course Coordinator: Prof. Mohamed El-Shourbagy

Head of Botany Department: Prof. AlaaAbou-Zeid

TantaUniversity, Faculty of Science

M. Sc. Course specifications of Phycology

A- Basic Information

Title: Physiology of Microorganisms	Code: 1534
Coordinator	Prof. Atef Abo-Shady
Other Staff	Dr. SamiaShabana
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	14 x 1h lectures (First term) 14 x 2h practical (First term) 14 x 1h lectures (Second term) 14 x 2h practical (Second term)

Academic Year :2014-2015

B- Professional Information

Course aims:

- Provide the students of microbiology with an understanding of the basic principles and core of what are algae and how they live, reproduce and cultivation- Teach the students how to identify algae of lakes, soils, streams and ponds as well as marine algae Explore the fundamental principles of fungal physiology especially spore germination, with reference to dormancy, constitutive dormancy, exogenous dormancy, enzyme complement and biosynthetic process during spore germination.

2. Intended learning outcomes of course (ILOs)

A-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1.	Recognize the general characteristics of algae.
A2.	Define the essential enzymes required for growth and metabolism
A3.	Identify the basis of fungi transformation process.
A4.	Explain dormancy of fungal spores.
A5.	Discuss how constitutive dormancy of spores can be broken.

B- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-	
B1.	Illustrates the germination of spores and its requirement.
B2.	Demonstrate the role of Algae in water quality.
B3.	Distinguish the principles, underlying fungi metabolism.
B4.	Demonstrate how to use algae as biomarkers and indicators for water pollution.
B5.	Assess how algae affect our life

C- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-

C1. Use different methods for fungi laboratory manipulation.
C2. Use statistical to evaluate the efficiency of different methods used in that field.
C3. Manage strategy for fungi metabolism and transformation processes by fungi
C4. Prosecute of research by applications of laboratory or field techniques

D- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-

D1. Work safely, competently and effectively in the laboratory
D2. prepare complete and clean scientific report
D3. work with others, use and manage ideas and information
D4. Draw and label curves, habits, sections …. etc.

3. Contents
A. Theoritical

Physiology of microalgae	
Week	**Topic**
1	What are algae?
2	Algae and the food they make
3	Algae of streams and rivers
4	Methods for studying phytoplanktons
5	How algae grow and reproduce
6	Cell division in diatoms
7	Reproduction units in algae

8	Algae of Lakes and ponds
9	Effect of light on the distribution of algae in Lakes and ponds
10	Effect of nutrients on algae distribution
11	Toxic algae
12	How to determine the toxins in water
13	Algae as indicators for water quality and pollution
14	Assessment
Physiology of Bacteria	
Week	**Topic**
1	Origin of cellular life
2	Taxonomy and classification of microbes
3	Size, distriburion and identification of bacteria and archaea
4	Structure and function of cell wall of bacteria
5	Structure and function of plasma membrane of bacteria
6	Structure and function of pili, flagella, capsules of bacteria
7	Structure and function of ribosomes, inclusions, chromosome, plasmid of bacteria
8	Nutritional requirement of bacteria
9	Physical requirements for bacterial growth
10	environmental requirements for bacterial growth
11	Antimicrobial agents
12	Bacterial mechanisms of antibiotic resistance
13	Bacterial reproduction and growth curve
14	Positive and negative aspects of bacteria
15	Assessment

B. Practical

Algae and physiology of algae(4 hour / week)	
Week	**Topic**
1	Isolation of algae from different sources
2	Purification of isolated algae 1
3	Purification of isolated algae 2
4	Different methods of measurement of algal growth
5	Measurement of growth curve by OD
6	Measurement of growth using biomass productivity
7	Studying the effect of carbon source on algal growth
8	Field trip for collection of seaweed
9	Studying the effect of organic compounds on algal growth
10	Effect of nitrogen and phosphorus nutrition on growth.
11	Oxidative stress caused by H2O2
12	Antimicrobial activity by some of the isolated algae
13	Antimicrobial production from seaweeds
14	Assessment
Physiology of Bacteria(2 hour / week)	
Week	**Topic**
1	Safety in microbiological labs
2	Isolation of bacteria from common sources
3	cultivation of bacteria on different media
4	colony descriptions
5	purification of bacterial isolates
6	biochemical methods (1) for identification of bacteria
7	biochemical methods (2) for identification of bacteria
8	preparation of bacterial suspensions and smears

9	simple and negative stains
10	Gram stain, Acid fast stain,
11	capsule stain, Endospore stain
12	isolation of plasmids
13	detection of some virulence factor genes
14	Revision

4. Teaching and learning methods

a. Lectures ☒
b. Practical training / laboratory ☒
c. Seminar / Workshop ☐
d. Class Activity -

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P

Assessment schedule

Assessment 1	Practical exam	Week	15
Assessment 2	Final exam	Week	16

Weighting of assessments

Final-term Examination	60	%
Practical Examination	40	%
Total	100	%

6. List of references

Essential books (text books)

- Algal Ecology, Freshwater benthic ecosystems, Edited by Stevenson, R.J., Bothwell, M.L., Lowe R.L. Academic Press (1996)
- Algal culturing techniques, Edit Anderson, R.A., Elsivier (2005)
- Fungal Physiology, Second Edition by David H. Griffin, Wiley-Liss, A John Wiley & Sons, Inc, Publication, New York (1994)
- Advances in Fungal Biotechnology for Industry, Agriculture, and MedicineEdited by Tkacz, Jan S.; Lange, Lene

Springer 2004

Recommended books

• Fungal Genomics - Applied Mycology and Biotechnology volume 4 Edited by D K Arora and G GKhachatourians Elsevier February 2004

Web sites

http://www.google.com http://www.Algaebase.com http://www.elsevier.com/books/title/a

7. Facilities required for teaching and learning

- Generic resources, such as the library.
- Electronic copies of past exam papers and example assessments.
- Computer Aided, such as E-mail, online conference, data show.
- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

Prof. Atef Abo-Shady

Head of Department:

Prof. AlaaAbou-Zeid

Date: 08/2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code: 1534		**Course title: Physiology of algae+Physiology of fungi**																									
Course Contents / Theoritical	**Practical**	**Knowledge and understanding**						**Intellectual**									**Practical**						**Tranferrable**				
Physiology of algae		**A 1**	**A 2**	**A 3**	**A 4**	**A 5**	**A 6**	**B 1**	**B 2**	**B 3**	**B 4**	**B 5**	**B 6**	**B 7**	**B 8**	**B 9**	**C 1**	**C 2**	**C 3**	**C 4**	**C 5**	**C 6**	**D 1**	**D 2**	**D 3**	**D 4**	**D 5**
What are algae?		√	√				√	√	√	√				√											√	√	√
	Isolation of algae from different sources																√	√	√	√							
Algae and the food they make		√	√				√			√				√												√	√
	Purification of																√		√	√	√	√					

	isolated algae 1																										
Algae of streams and rivers				√	√					√	√												√	√	√	√	√
	Purification of isolated algae 2																√	√	√	√	√	√					
Methods for studying phytoplanktons		√						√	√	√																√	√
	Different methods of measurement of algal growth																√	√		√	√	√					
How								√	√																	√	√

algae grow and reproduce																											
	Measurement of growth curve by OD																	√	√		√	√					
Cell division in diatoms		√	√						√	√																√	√
	Measurement of growth using biomass productivity																√	√			√	√					
Reproduction units in algae		√				√	√								√	√							√	√			

	Studying the effect of carbon source on algal growth																	√	√	√	√	√					
Algae of Lakes and ponds				√	√	√					√	√											√				
	Field trip for collection of seaweed																	√	√								
Effect of light on the distribution of algae in Lakes and									√	√													√				

ponds																											
	Studying the effect of organic compounds on algal growth																	√	√	√	√	√					
Effect of nutrients on algae distribution						√	√	√					√	√	√	√								√	√	√	√
	Effect of nitrogen and phosphorus nutrition on growth.																√	√	√								
Toxic		√	√	√	√	√	√							√	√	√											

algae																											
	Oxidative stress caused by H2O2															√	√		√	√	√						
How to determine the toxins in water		√	√	√				√	√	√	√	√	√	√	√								√	√	√	√	√
	Antimicrobial activity by some of the isolated algae																	√	√	√	√	√					
Algae as indicators for water quality		√	√	√				√	√	√	√	√	√	√	√					√		√	√	√	√	√	√

and pollution																											
	Antimicrobial production from sea weeds																√		√				√				
Assessment		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							√	√	√	√	√
	Assessment																√	√	√	√	√	√					
Physiology of Bacteria																											
Origin of cellular life		√	√				√	√	√	√				√											√	√	√
																	√	√	√	√							
Taxonomy and classification of microbes		√	√				√			√				√												√	√
																	√		√	√	√	√					

Size, distriburion and identification of bacteria and archaea				√	√					√	√												√	√	√	√	√
																	√	√	√	√	√	√					
Structure and function of cell wall of bacteria		√						√	√	√																√	√
																	√	√		√	√	√					
Structure and function of plasma membrane of bacteria								√	√																	√	√

																	√	√		√	√						
Structure and function of pili, flagella, capsules of bacteria		√	√						√	√																√	√
																√	√			√	√						
Structure and function of ribosomes, inclusions, chromosome, plasmid of bacteria		√				√	√								√	√							√	√			
																	√	√	√	√	√						
Nutritional requ				√	√	√					√	√											√				

irement of bacteria																											
																	√	√									
Physical requirements for bacterial growth									√	√												√					
																	√	√	√	√	√						
environmental requirements for bacterial growth						√	√	√					√	√	√	√								√	√	√	√
																√	√	√									
Antimicrobial agents		√	√	√	√	√	√							√	√	√											
															√	√		√	√	√							
Bacterial mechani		√	√	√				√	√	√	√	√	√	√	√							√	√	√	√	√	

sms of antibiotic resistance																											
																	√	√	√	√	√						
Bacterial reproduction and growth curve		√	√	√				√	√	√	√	√	√	√	√					√		√	√	√	√	√	√
																	√	√	√	√	√						
Positive and negative aspects of bacteria		√	√	√				√	√	√	√	√	√	√	√								√	√	√	√	√
	Assessment																√	√	√	√	√						
Assessment		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							√	√	√	√	√

Learning and Teaching Methods

	Physiology of Algae																	
LearingMethod	Course outcomes ILOs																	
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4
Lecture	√	√	√	√	√		√	√										
Discussion (Brain Storming)																		
Self-learing (Essay)																		
Field Trips																		
Practical											√	√	√	√				

Assessment Methods

	Physiology of Algae																	
AssessmentMethods	Course outcomes ILOs																	
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills				Gener l and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4
Essay Question	√	√	√	√	√		√			√								
Practical											√	√	√					
AssessmentMethods																		

Course Coordinator: Prof. Atef Abo-Shady

Head of Botany Department: Prof. AlaaAbou-Zeid8/ 2014

TantaUniversity, Faculty of Science

M. Sc. Course specifications of Phycology

A- Basic Information

Title: Biostatistics	Code: 1518
Coordinator	Professor Kamal Shaltout
Other Staff	Dr. Mohamed Abdelmonsef
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	14 x 1h lectures (First term) 14 x 1h lectures (Second term) 14 x 2h practical (Second term)

Academic Year : 2014-2015

B- Professional Information

1. Course aims:

- Achieve a comprehensible form of the too much data that characterizes the modern biological research.Apply statistical tests for evaluating differences, variations and associations between populations and their significance in probability termsTeach the students the modern software programs for statistical analysis and to interpret and make inferences from analysis of set of observations sampled from a population. Find out the best possible experimental design that provides the best sorting out of the controlled and uncontrolled variations.

2. Intended learning outcomes of course (ILOs)

A-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Identify the role of the biostatistics in the procedure of the biological scientific research.

A2. Recognize the association between variables in normal and non-normal distributed populations (correlations and regressions).

A3. Compare between each pair of treatments in multi-treatment experiments

A4. Explain the tests of significance of difference between two or more than two sampled populations.

A5. Discuss the application, advantages and disadvantages of the different types of experimental designs.

B- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-
C4. Differentiate between the characteristics of the different types of distributions
C5. Demonstrate the principles and approaches underlying current methods of biostatistics and its application using computer software programs
C6. Apply the best suitable statistical tests for the different biological experiments
C7. Design suitable experimental
C8. Analyze the results statistically

C- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-
B1. Perform the best suitable statistical tests for the different biological experiments
B2. Provide the statistical consultation for the students and researchers of biology.
B3. Prepare the suitable experimental design and how to analyze the results statistically

D- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-
D9. Use databases and library search methods as well as internet sites
D10. Independent learning ability required for continuing professional development
D11. Work with others, use and manage ideas and information .
D12. Demonstrate written and verbal communication skills on modern approaches

3. Contents

Week	Topic
1	Introduction about Biostatistics as a tool of scientific research
2	Sampling of attributes
3	Frequency and probability distributions
4	Normal distribution
5	Binomial distribution
6	Frequency and probability distributions
7	Normal distribution and Binomial distribution
8	Poisson distribution
9	Tests of significance

10	Round-up discussion on the previous topics
11	Partial examination
12	Introductory note on analysis of variance
13	Data transformations, One-way analysis of variance
14	Some basic experimental designs (completely random, randomized complete block and Latin square designs)
15	Two-way analysis of variance
16	Split-plot experimental design Split-plot experimental design
17	Least significant difference (LSD)
28	Least significant range (LSR) tests
29	Simple linear regression
20	Simple linear regression
21	Rank correlation
22	Curve fitting
23	method of least squares
24	Multiple correlation, regression and analysis of time series
25	Multiple regression
26	Analysis of time series
27	Round up discussion on the previous topics
28	Round up discussion on the previous topics

4. Teaching and learning methods

a. Lectures ☒
b. Practical training / laboratory ☒
c. Seminar / Workshop ☐
d. Class Activity -

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P

Semester work	to assess	-

Assessment schedule

Assessment 1	Practical exam	Week	15
Assessment 2	Final exam	Week	16

Weighting of assessments

Final-term Examination	60	%
Practical Examination	40	%
Semester work	-	%
Total	100	%

6. List of references

Essential books (text books)

- Zar, J. H. 1984. Biostatistical Analysis: Second Edition. Prentice Hall, Inc., New Jersy, USA
- Snedecor, G. W. & Cochran, W. G. 1967. Satistical Methods. The Iowa State University Press, Iowa, USA.
- Zar, J. H. 1984. Biostatistical Analysis: Second Edition. Prentice Hall, Inc., New Jersy, USA
- Snedecor, G. W. & Cochran, W. G. 1967. Satistical Methods. The Iowa State University Press, Iowa, USA.

Recommended books

- Voelkl, K. E. & Gerber, S. B. 1999. Using SPSS for Windows: Data Analysis and Graphics. Springer, New York, USA.
- Stephens, L. J. 1998. Beginning Statistics. Schaum's Outline Series, McGraw-Hill. New York, USA.

Web sites

- www.google.com
- http://www.accessexcellence.org/RC/genetics.htm
- www.researchnavigator.com

7. Facilities required for teaching and learning

- Generic resources, such as the library.
- Electronic copies of past exam papers and example assessments.

- Computer Aided, such as E-mail, online conference, data show.
- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

Professor Kamal Shaltout

Head of Department:

Prof. AlaaAbou-Zeid

Date: 08/2014

TantaUniversity, Faculty of Science

Course Contents – Course ILOs Matrix

Course code:		1518					**Course title:**					Biostatistics						
W	Titles	Knowledge and Understanding					Intellectual skills					Practical skills			Transferable Skills			
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4
1	Introduction about Biostatistics as a tool of scientific research					√	√	√	√				√					√
2	Sampling of attributes					√	√	√	√				√					√
3	Frequency and probability distributions					√	√	√	√				√					√
4	Normal distribution	√	√	√	√	√	√	√	√				√					√
5	Binomial distribution	√				√	√	√	√	√					√	√	√	√
6	Frequency and probability distributions	√				√	√	√	√	√					√	√	√	√
7	Normal distribution and Binomial distribution	√				√	√	√	√	√					√	√	√	√
8	Poisson distribution	√	√	√	√	√							√	√	√	√	√	√
9	Tests of significance	√											√	√	√	√	√	√
10	Round-up discussion on the previous topics	√					√	√				√	√	√	√	√	√	√
11	Partial examination	√			√	√	√	√	√								√	√
12	Introductory note on analysis of variance	√			√	√	√	√	√								√	√
13	Data transformations, One-way analysis of variance	√			√	√											√	√
14	Some basic experimental designs (completely			√	√		√				√	√						

	random, randomized complete block and Latin square designs)																	
15	Two-way analysis of variance			√	√		√				√	√						
16	Split-plot experimental design Split-plot experimental design			√	√		√	√	√	√	√	√						
17	Least significant difference (LSD)	√				√	√	√	√	√	√	√						
18	Least significant range (LSR) tests	√				√	√	√						√	√	√	√	√
19	Simple linear regression	√				√	√	√						√	√			√
20	Simple linear regression	√	√	√			√	√						√	√			√
21	Rank correlation	√	√	√			√	√						√	√	√	√	√
22	Curve fitting	√				√	√	√	√	√	√	√					√	√
23	method of least squares	√				√	√	√	√	√	√	√					√	√
24	Multiple correlation, regression and analysis of time series	√				√	√	√	√	√	√	√					√	√
25	Multiple regression	√	√			√			√	√	√					√	√	
26	Analysis of time series	√	√			√			√						√	√	√	

Learning and Teaching Methods

	Physiology of Algae																	
LearingMethod	Course outcomes ILOs																	
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3		D1	D2	D3	D4
Lecture	√	√	√	√	√				√	√								
Practical											√	√	√					

Assessment Methods

	Physiology of Algae																	
AssessmentMethods	Course outcomes ILOs																	
	Knowledge and Understanding					Intellectual Skill					Professional and Practical Skills				General and Transferable Skills			
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3		D1	D2	D3	D4
Essay Question	√	√	√	√	√		√	√										
Practical											√	√						

Course Coordinator:Prof. Kamal Shaltout

Head of Botany Department:Prof. AlaaAbou-Zeid

Tanta University, Faculty of Science

M. Sc. Course specifications of Phycology

Department offering the programme	Botany Department
Department offering the course	Botany
Academic year / Level	2014/2015, Two terms
Date of specification approval	08/2014

A- Basic Information

Title: **Computer**	Code: 1573
Tutorial:	Practical: 1
Total:	
Coordinator	**Prof. Mohamed El-Awady**
Other Staff	**Prof. Mahmoud Kamel, Prof. Ahmed El-Shishtawy, Prof. QadryZakaria**
Pre-Requisite	GC level Biology or its equivalent
Course Delivery	**Lectures: 28 x 1h lectures** **Practical: 28 x 1h lectures**

B- Professional Information

2. **course aims:**

Develop students` capability for information retrieval and presentation, and proficiency in the use of IT effectively in the context of their studies.Develop Underpin academic work throughout postgraduate studies.

Provide opportunities to develop skills required for team working, oral presentation of scientific material, and career choices.

2. **Intended learning outcomes of course (ILOs)**

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A7. Recognize the diverse media and hardware and software that help to benefit of the IT in the context of the postgraduate studies.

Arrange powerful presentation using sophisticated software packages.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-
B2. Integrate different application programs to develop effective information analysis and presentation. C2. Solve scientific problems using computer programming.

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-
e. Use a number of computer packages to present information. f. Perform necessary graphical, statistical and frequency analyses of different types of data. g. Use of different internet resources. h. Use of different photo enhancing and manipulation techniques.

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-
D9. Internet/electronic resources to obtain subject specific information, and to develop lifelong learning skills that can be applied to suitable research problems.

3. Contents

Lectures 1-2 — Methods for graphical representations, Data analysis and Data modeling

Assignment 1 : **Using Application programs**

Calculation of Slope and intersection of lines ,

Best fitting for data,

Extracting Trend , and Equations for acquired data (linear – exponential- logarithmic ….etc)

Lectures 3-5 — Statistical Data analysis

Assignment 2 : **Using Application programs**

Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data

Lecture 6-7 — Creating powerful presentation including charts, images, video, etc and different attractive animations

Assignment 3 : **Using PowerPoint program**

Design a real and powerful presentation with different acquired skills

Lecture 8-9	Use of internet capabilities and searching engines
	Assignment 4: Using the Internet
	Life search on the internet for some real information
Lecture 10-11	Creating Data Base and related Queries and Reports
	Assignment 5: Using Application programs
	Creating a real Data Base and apply different queries and reports to extract useful information
Lecture 12-13	Computer programming language
	Assignment 6: Programming using Visual Basic 6
	Solving real problems using a computer language
Lecture 14-15	Photo manipulation and enhancement using the photoshop
	Assignment 7: **Using the Photoshop program**
	Practicing on manipulation and enhancing of images
Lectures 16	Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities

4. Teaching and learning methods

a. Lectures	☒
b. Practical training / laboratory	☒
c. Seminar / Workshop	☐
d. Class Activity	-

5. Student assessment methods

Written final exam	to assess	KU, I
Practical	to assess	P
Semester work	to assess	-

Assessment schedule

Assessment 1	Practical exam	Week	15

Assessment 2	Final exam	Week	16

Weighing of assessments

Final-term Examination	60	%
Practical Examination	40	%
Semester work	-	%
Total	100	%

6. List of references

Course notes

Notes given to students at each section describe the tasks to be completed, therefore no particular book(s) recommended.

Essential books (text books)

Recommended books

Web sites

7. Facilities required for teaching and learning

- Projectors; Video and Overhead
- LCD screens and writing Boards
- Commercial computer scientific software packages.

Course coordinator:

Prof. Mohamed El-Awady

Head of Department:

Prof. AlaaAbou-Zeid

Tanta University, Faculty of Science

Date: **08/2014**

Course Contents – Course ILOs Matrix

Course code:1557, **course title: Computer**

Course Contents	Weeks	Knowledge and understanding					Intellectual					Practical					Tranferrable				
		A 1	A 2	A 3	A 4	A 5	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	C 5	D 1	D 2	D 3	D 4	D 5
Methods for graphical representations, Data analysis and Data modeling	1	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 1 : Using Application programs Calculation of Slope and intersection of lines , Best fitting for data, Extracting Trend , and Equations for	2	✓					✓	✓				✓	✓	✓	✓		✓				

acquired data (linear – exponential-logarithmic ….etc)																					
Statistical Data analysis	3	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 2 : Using Application programs Apply some statistical function such as Average, Median, STDEV, and Correlation on a simulated data	4	✓					✓	✓				✓	✓	✓	✓		✓				
Creating powerful presentation	5	✓					✓	✓				✓	✓	✓	✓		✓				

including charts, images, video, etc and different attractive animations																					
Assignment 3 : Using Power Point program Design a real and powerful presentation with different acquired skills	6	✓					✓	✓				✓	✓	✓	✓		✓				
Use of internet capabilities and searching engines	7	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 4:	8	✓					✓	✓				✓	✓	✓	✓		✓				

Using the Internet Life search on the internet for some real information																					
Creating Data Base and related Queries and Reports	9	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 5: Using Application programs Creating a real Data Base and apply different queries and reports to extract useful informa	10	✓					✓	✓				✓	✓	✓	✓		✓				

tion																					
Computer programming language	11	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 6: Programming using Visual Basic 6 Solving real problems using a computer language	12	✓					✓	✓				✓			✓		✓				
Photo manipulation and enhancement using the photoshop	13	✓					✓	✓				✓	✓	✓	✓		✓				
Assignment 7: **Using the Photoshop program** Practicing on	14	✓					✓	✓				✓	✓	✓	✓		✓				

manipulation and enhancing of images																					
Introduction to Data frequency analysis using Fourier analysis and Fourier transformation searching for periodicities	15	✓					✓	✓				✓	✓	✓	✓		✓				
Assessment																					

Learning and Teaching Methods

LearingMethod	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A2	A3	A4	A5	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	C 5	D1	D2	D 3	D 4	D 5
Lecture	√	√	√	√	√		√	√		√										
Discussion (Brain Storming)																				
Self-learing (Essay)																				
Field Trips																				
Practical											√	√	√	√	√					

Assessment Methods

AssessmentMethods	Course outcomes ILOs																			
	Knowledge and Understanding					Intellectual Skills					Professional and Practical Skills					General and Transferable Skills				
	A1	A 2	A 3	A 4	A5	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	C 5	D 1	D 2	D 3	D 4	D 5
Essay Question	√	√	√	√	√		√													
Practical											√		√		√					

Course coordinator:Prof. Mohamed El-Awady

Head of -- Department:Prof. AlaaAbou-Zeid

Diploma program
of
Microbiology

Tanta University, Faculty of Science

Diploma program specifications of Microbiology

Program parent Department	Botany Department
Academic year	2014/2015
Date of specification approval	8/2014

A- Basic Information:

Program title:	Diploma Degree in Microbiology.
Program type	Single.
Coordinator:	Head of Botany Department.
QAA Benchmarking Standards	Academic Reference Standards (ARS)
Date of Delivery	Every year in June
Review Date	Internal Periodic Review, every Summer

B- Professional Information

1- Program aims :

Deliver students with a broad understanding of the fundamental principles of Microbiology emphasizing Fungi, Bacteriology and Virology and its impact on human, animals and plants.

Study the diverse aspects of the field of microbiology, including biochemistry, ecology, genetics, molecular biology, pathogenicity, phylogeny, industrial application of micro-organisms in different fields.The program aimed to prepare the students to diploma program in the field of microbiology or to the professional employment.Equip students with IT and statistical parameters to present and edit their data.

3. Intended learning outcomes of course (ILOs)

A. Knowledge and understanding:

By the end of the programme successful students who have attended regularly and completed required work will be able to know and understand of:

A1. The main concepts of biology- microbiology and related basis of chemistry, physics and mathematics.

A2. The fundamental principles of Microbiology emphasizing Fungi, Bacteriology, Virology, and immunology

A3. The role of microorganisms at industrial and environmental levels.

A4. The diverse aspects of the field of microbiology, including biochemistry, ecology, genetics, molecular biology, pathogenicity, phylogeny, industrial application of microorganisms in different fields.

B. Intellectual skills:

By the end of the program successful students who have attended regularly and completed required work will:

B1. use integrated approaches to problem solving
B2. transfer appropriate knowledge and methods from one topic to another within the overall subject
B3. plan, conduct and write a report on an independent project
B4. the ability to comprehend, analyze and criticize published information in microbiology; and formulate hypotheses independently or with the minimum of assistance

C. Professional and practical skills:

C1. Search, select and utilize appropriate computer software in order to achieve literature searches effectively to find information on a specific topic.
C2. Analyze data from his experimental work and other people's experiments and to interpret them in the light of published work.
C3. Select and apply a range of practical skills relevant to the chosen areas of Microbiology.
C4. Propose and Carry out practical work, in the field and in the laboratory, with minimal risk.

D. General and transferable skills:

By the end of the programme successful students who have attended regularly and completed the proposed work will be able to:

D1. communicate scientific ideas, give oral and poster presentations and work as part of a research team.

D2. use library resources and other information sources.

D3. plan their career.

3. Academic standards

The Academic Reference Standards for the award of master in Plant physiology As well as the attributes and capabilities of the graduate. This program gives an opportunity to:

- Provide students with the main basic and updated concepts of microbiology at advanced level.
- Deliver students with a broad understanding of the fundamental principles of Microbiology emphasizing Fungi, Bacteriology and Virology and its impact on human, animals and plants

- Study the diverse aspects of the field of microbiology, including biochemistry, ecology, genetics, molecular biology, pathogenicity, phylogeny, industrial application of microorganisms in different fields.
- Equip students with IT.

3.A External references for standards (Benchmarks):

In order to fulfill international standards, our students should acquire

I. Knowledge and Understanding:

Approaches to study and forms of subject knowledge likely to be common to Microbiology degree program will include the following:

knowledge and understanding of the processes and mechanisms of microbes.

From molecular to cellular level

From microbial cell metabolic pathways to the community and environment benefits.

- engagement with the essential facts, major concepts, principles and theories associated with Microbiology.
- understanding of information and data, and their setting within a theoretical framework.
- familiarity with the:
    - Classification systems as appropriate.
    - Methods of acquiring, interpreting and analysing microbiological information with a critical understanding of the appropriate contexts for their use through the:
    - Study of texts.
    - Original papers.
    - Reports and data sets.
- Developing knowledge about the diversity of microorganisms and its evolution.
- Knowledge of a range of practical techniques and methodologies, including:
    - Data analysis.
    - Use of statistics.
- Engagement with current developments in microbiology and their applications, and the philosophical and ethical issues involved.
- The applicability of the biosciences (Microbiology) to the careers to which graduates will be progressing.

II. Skills

E. Generic skills

- an appreciation of the complexity and diversity of life processes through the study of immunology, microorganisms, viruses, bacteria, yeasts and fungi, their molecular, cellular and physiological processes, their genetics and evolution, and the interrelationships between them and their environment.

- the ability to read and use appropriate literature with a full and critical understanding.
- the capacity to give a clear and accurate account of a subject
- critical and analytical skills: a recognition that statements should be tested and that evidence is subject to assessment and critical evaluation.
- the ability to employ a variety of methods of study in investigating, recording and analyzing microbiological topics or idea of research
- the ability to think independent, set tasks and solve problems.

F. Key skills (graduate)

The specific key skills that should be developed in Microbiology degree courses are subdivided into:-

1. Intellectual skills

- Recognizing and applying subject-specific theories, concepts or principles. For example:
  - The relationship between genes and proteins.
  - The nature of essential nutrients in microbes
  - Analyzing and summarizing information critically, including published research or reports;
- Obtaining and integrating several lines of subject-specific evidence to formulate and test hypotheses;

Applying subject knowledge and understanding to address familiar and unfamiliar problems

2. Practical skills

- Designing, planning, conducting and reporting on investigations. The data may be obtained through:
  - Individual.
  - group projects.
- Obtaining, recording, collecting and analyzing data using appropriate techniques in the field and/or laboratory, working by themselves or in a group.
- Undertaking field and/or laboratory investigations of living systems in a responsible, safe and ethical manner.
- Preparing, processing, interpreting and presenting data, using appropriate qualitative and quantitative techniques:

  - Statistical programmes.
  - Spreadsheets.
  - Programs for presenting data visually.

- Solving problems by a variety of methods including the use of computers.
- Using the internet and other electronic sources critically as a means of communication and a source of information.

3. Interpersonal and teamwork skills

- Identifying individual and collective goals and responsibilities and performing in a manner appropriate to these roles.
- Recognizing and respecting the views and opinions of other team members.
- Negotiating skills.
- Evaluating performance as an individual and a team member; evaluating the performance of others.
- Developing an appreciation of the interdisciplinary nature of science and of the validity of different points of view.
-

4. Self-management and professional development skills

- Developing the skills necessary for self-managed and lifelong learning (e.g. working independent, time management and organization skills).
- Identifying and working towards targets for personal, academic and career development.
- Developing an adaptable, flexible, and effective approach to study and work.

3.B-Comparison of provision to external references:

International Academic Standards (NARS)

- Although the provision is quite comparable to its benchmark there are a number of points that should be highlighted for the purpose of achieving advancement in the specifications and qualities of the Microbiology program at Botany Department, Faculty of Science, Tanta University as follows:
- Searching for new antimicrobial compounds, microbial genetic diversity and microbial enzymes applications.
- Skill of performing diverse laboratory techniques of molecular biology important in the improving quality and quantity of crops yield and controlling plant pathogens should be stressed upon. Furthermore, skills of performing Laboratory food analysis to evaluate the food mycological toxin as health dangerous agent should be addressed.
- Microbiology Diploma students should acquire proper skills to keep up with the microbiological literature and to appreciate the need for life-long continuing education, starting the day after their graduation.
- Students should have the aptitude of critical evaluation, synthesis and interpretation of botanical information and data, production of botany-

specific scientific documentation, and presentation of botanical information and arguments clearly and correctly in writing and orally, to both specialist and lay audiences.

-

1. **4.a.Program duration:** One academic year (2 semesters).
2. **4.b.Program Structure:**
3. All applicants admitted to the diploma program are required to study 6 selected theoretical courses and one practical course approved by the department council from the master courses offered by the department for one academic year. A part of the M.Sc. courses offered by the Botany Department, the student should study a course in English language for a minimum one hour per week. Albeit, students who have taken equivalent English language course may be exampled from it upon the recommendation of the Faculty Council.
4. **No. of hours per week:** 12 Lectures and 6 hours practical
5. The registration for the preliminary year takes place in October, and the final exam. Is held once a year (June) in the date approved by the Faculty Council.
6. **Grade Assessment:**
7. Final Written Exam.60%
8. Final Practical Exam 40%
9. *< 60% failed
10. 60-64 passed, 65-79 good, 80-89 very good, >90% excellent
11. *Failed students can repeat the course (s) only once.

5. Program Contents

N	Code	Course Name	Lecturer
1	2052	Phycology, Physiology of algae, physiology of fungi, virology	Prof. Dr. Atef Abo-Shady Dr. Rania El-Shenoudy Dr. Saida Amer Dr. Samia Shabana
2	2053	Fermentation, Immunology, Phytopathology, special fungi.	Prof. Dr. Omyma Awadalla Prof. Dr. Susan Assawah Prof. Dr. Nanis Allam Prof. Dr.Eman Abdel-Zaher
3	2054	General bacteriology, applied bacteriology, applied mycology, instrumental methods of microbiology, use of microorganisms in leather tanning	Prof. Dr. Wagih El-Shouny Prof. Dr. Essam Azab Prof. Dr. M. Yasser Bedaiwy Dr.Samia Shabana
4	2055	Biochemistry	Prof. Dr. Nasser Sewelam
5	1518	Biostatistics	Prof. Dr. Kamal Shaltout Dr. Mohamed Abdelmonsef

Course Name	Code	Contents

	No	
Phycology, Physiology of algae, physiology of fungi, virology	2052	The basic principles and core of what are algae and how they live, reproduce and cultivation How to identify algae of lakes, soils, streams and ponds as well as marine algae.Exploring the fundamental principles of fungal physiology especially spore germination, with reference to dormancy, constitutive dormancy, exogenous dormancy, enzyme complement and biosynthetic process during spore germination. Understand the feature, molecular structure, transmission and diagnosis of many of viral diseases.
Fermentation, Immunology, plant pathology, special fungi.	2053	Provide the students with the fundamental concepts of sucrose and lipid metabolism and related enzymes. Equipped the students with the basis of immunity to bacteria and fungi.Discuss the mechanism of immunology in tumor and viruses. Identify the defense systems in Plant.Develop the modern experimental approaches in biochemistry of fermentation, selection and preservation of microorganisms and production of useful materials. Classify the different group of fungi and give an account on it's hosts in different habitats. Explore the principles of plant pathology in terms of disease cycle, plant defense against pathogens and methods for controlling plant diseases.
General bacteriology, applied bacteriology, applied mycology, instrumental methods of microbiology, use of microorganisms in leather tanning	2054	Teach students the modern experimental approaches in bacteriology that reflect the microbial diversity and evolution, in addition to modern techniques used for classification and diagnosis of bacteria.Provide students with the fundamental concepts and principles of microbial mutation basis, polymerase chain reaction, DNA southern blotting, RNA blotting, Western blotting, microbial genes isolation, cloning and expression. In addition to, natural antimicrobial compounds and assessment methods. Learn about Leather industrial tanning process and the roles of microorganisms in this industry. Also, the applications of microbial enzymes in leather treatments.Use of agriculture waste materials for cultivation of edible mushroom and the possible means for biodegradation of colored effluents, in addition to the nature of water pollution with

		microorganisms.
Biochemistry	2055	Growth rhythms, decomposers of leaves, Effect of the toxic environment on microbial growth, The role of cyanobacteria in nitrogen fixation
Biostatistics	1518	Statistical definitions, sampling of attributes, distributions (Normal, Binomial, Poisson), and tests of significance, Part two: Analysis of variance, experimental designs, association between variables, curve fitting and the method of least square, multiple and partial correlation and regressions, and analysis of time series.

Program coordinator:

Prof. Dr.: Alaa Abou-Zeid

Head of Department:

Prof. Dr.: Alaa Abou-Zeid

Date : 08/2014

12. Microbiology Diploma program matrix

Course Title	Course code	Diploma program Microbiology matrix														
		Knowledge and Understanding				Intellectual skills				Professional skills				General skills		
		A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3
Algae, Physiology of Algae, Physiology of fungi	2052	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Biochemistry of fermentation, Immunology, Plant pathology and Special fungi	2053				√	√			√	√		√			√	
General Bacteriology, Applied Bacteriology, Applied Mycology, Methodology and Instruments used in microbiology and Tanning of leather	2054	√			√	√			√			√	√	√		√
Coordinator and Head of Department: Prof. Dr.: Alaa Mostafa Abou-Zeid																

Title: **Algae, Physiology of Algae, Physiology of fungi**	Code: 2052
Coordinator	**Prof. Atef Abo Shady**
Other Staff	**Prof. Saida Amer** **Dr. Samia Shabana** **Dr. Rania El-Shenoudy**
Course Delivery	**1st semester: 14 x 3h lectures** **14 x 4h practical** **2nd semester: 14 x 1 lectures** **14 x 2 practical**
Date of approval	**8/2014**

Academic Year : 2014-2015

Professional Information

Course aims:

- The basic principles and core of what are algae and how they live, reproduce and cultivation How to identify algae of lakes, soils, streams and ponds as well as marine algae. Exploring the fundamental principles of fungal physiology especially spore germination, with reference to dormancy, constitutive dormancy, exogenous dormancy, enzyme complement and biosynthetic process during spore germination. Understand the feature, molecular structure, transmission and diagnosis of many of viral diseases.

Intended learning outcomes of course (ILOs)

a- **Knowledge and understanding:**

By the end of the Diploma course the graduate must be able to :-

A.1- Identify the Characteristics of algae.

A.2- recognizes the essential enzymes required for growth and metabolism**.**

A.3. List the role of Algae in microbiological activities and in water quality.

A.4 Identify the structure of some diseased viruses plants changes.

A5- List the symptoms of viral infection and human diseases and diagnosis of them

A6 - Recognize the different methods for Viruses Prevention and its control

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-   B5. analyze microbiological information from a variety of sources   B6. Categorize the principles, underlying fungi metabolism and different nutrients metabolic regulatory circuits.   B7. Explain the basis of fungi transformation process.   B8. Demonstrate the principles of fungal physiology in a manner appropriate to their programme of study.   B9. Illustrate using algae as biomarkers and indicators for water pollution.   B10. distinguish the effect of algae on our life   B7. Differentiate between the different symptoms of plant virus infection.   B8. Illustrate the method of transmission of different types of hepatitis and HIV.   B9. Critically evaluates and discusses the primary literature and topics in virology.

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-   C5. Differentiate between the different groups of fungi and algae under microscope   C6. Determine pathways of some essential products produced by fungi and algae   C7. Use different methods for fungi laboratory manipulation.   C8. manage strategy for fungi metabolism and transformation processes by fungi   C9. use statistics to evaluate the efficiency of different methods used in that field   C10. carry out laboratory work

d- General and transferable skills

By the end of the Diploma course the graduate must be able to :-   D1. prepare of a research proposal   D2. prosecute of research by applications of laboratory or field techniques   D3. Prepare complete and clear scientific report   D4. Draw the micro-organisms   D5. Possess good project management and business skills.

Contents

Physiology of algae (1 hour / week)	
Week	**Topic**

1	Modes of nutrition in different algal phyla
2	Reserve food
3	Chloroplast structure and supramolecular organization of photosynthetic membranes
4	Photosynthesis
5	Photorespiration (Significant differences between unicellular algae, multicellular algae and higher plants
6	Effect of light quality on carbon metabolism
7	Assimilation of organic compounds (Acetate and glucose)
8	Effect of nitrogen and phosphorus nutrition on growth, pigments and photosynthesis
9	Biosorption of heavy metals and its use in purification of waste water.
10	Oxidative stress
11	Antioxidative defenses in some algae (antioxidant enzymes and molecules).
12	Antimicrobial production from micro algae.
13	Antimicrobial production from seaweeds
14	Exopolysaccharides and its role
15	Spirulina and its medical uses
Physiology of Fungi (1 hour / week)	
Week	**Topic**
1	Spore germination of fungi
2	Dormancy (exogenous dormancy)
3	Constitutive dormancy
4	Breaking dormancy
5	Stimulatory substances (maturation)
6	Heat shock proteins in fungi
7	Cellular effects of heat shock proteins

8	Heat shock and development
9	Chitosan and fungi
10	Production of chitosan by fungi
11	Some applications of chitosan
12	Fungicides
13	Systemic fungicides
14	Selective Topic
15	Uptake and translocation and mechanism of systemic fungicides action.
Phycology (1 hour / week)	
Week	**Topic**
1	What are algae
2	Algae and the food they make
3	Algae of streams and rivers
4	Methods for studying phytoplanktons
5	How algae grow and reproduce
6	Cell division in diatoms
7	Reproduction units in algae
8	Algae of Lakes and ponds
9	Effect of light on the distribution of algae in Lakes and ponds
10	Effect of nutrients on algae distribution
11	Toxic algae
12	How to determine the toxins in water
13	Algae as indicators for water quality and pollution
14	Genetic engineering of algae
15	Assessment
16	Transformation of algae

Virology (1 hour / week)	
Week	**Topic**
1	General features of virus
2	Factor affecting on transmission of plant virus
3	External symptoms of plant virus
4	Internal symptoms of plant virus
5	Different method of transmission of plant virus
6	Acquire resist of plant virus
7	Hepatitis A: structure, epidemiology diagnosis, prevention & care
8	Hepatitis B: structure, epidemiology diagnosis, prevention & care
9	Hepatitis C: structure, epidemiology diagnosis, prevention & care
10	Interferon
11	Human immunodeficiency virus(HIV)
12	Causes and type of cancer
13	Development of cancer cell

Practical

Algae and physiology of algae (2 hours / week)	
Week	**Topic**
1	Isolation of algae from different sources
2	Purification of isolated algae 1
3	Purification of isolated algae 2
4	Different methods of measurement of algal growth
5	Measurement of growth curve by OD
6	Measurement of growth using biomass productivity
7	Studying the effect of carbon source on algal growth

8	Field trip for collection of seaweed
9	Studying the effect of organic compounds on algal growth
10	Effect of nitrogen and phosphorus nutrition on growth.
11	Oxidative stress caused by H2O2
12	Antimicrobial activity by some of the isolated algae
13	Antimicrobial production from seaweeds
14	Assessment
Physiology of Fungi (2 hours / week)	
Week	**Topic**
1	Crowded-plate method
2	direct-soil- inoculation method (specific antibiotic method)
3	Dilution culture method
4	Streak method
5	Assay of antibiotics
6	Chemical assay
7	Biological assay
8	Cylinder-plate method
9	Turbidimetric method
10	All-or none growth method
11	Penicilin
12	Seperation and purification of penicillin:
13	Properties of penicillin
14	Assessment

Teaching, and learning methods:

4.1.Formal lecturing including visual PowerPoint; blackboard, and chalk presentation.

4.2. Supplementary information from internet, and library research.

4.3. Practical sections with good handling practice, and open discussions.

4.4. Independent learning tasks, external visits, and student activities.

Student assessment:

Assessment Method	Skills assessed*	Assessment Length	Schedule	Percentage	Degree
Written exam	K, I, T	2 h.	16th week	60	60
Practical exam	P, T	2 h.	15th week	40	40
Total				100	100

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

List of references

Course notes

Essential books (text books)

- Fungal Physiology, Second Edition by David H. Griffin, Wiley-Liss, A John Wiley & Sons, Inc, Publication, New York (1994)

- Advances in Fungal Biotechnology for Industry, Agriculture, and Medicine Edited by Tkacz, Jan S.; Lange, Lene Springer 2004

Recommended books

- Fungal Genomics - Applied Mycology and Biotechnology volume 4 Edited by D K Arora and G G Khachatourians Elsevier February 2004.

- Algal Ecology, Freshwater benthic ecosystems, Edited by Stevenson, R.J., Bothwell, M.L., Lowe R.L. Academic Press (1996)
- Algal culturing techniques, Edit Anderson, R.A., Elsivier (2005)

Virology of flowering plants W. A. Stevens, B. Sc Ph.D.

Lecture in botany, royal Holloway collage, university of London, Blackie

Glasgow and London distributed in the USA by Chapman and Hall , New York 2000

Web sites

- http://www.who.int/vaccines/intermediate/hepatitis. Accessed February 15, 2006
- http://www.who.int/inffs/en/fact 164.html. Accessed February 15, 2006
- http://www.google.de/
- www. Algaebase.com

Facilities required for teaching and learning

- Generic resources, such as the library.

- Electronic copies of past exam papers and example assessments.

- Computer Aided, such as E-mail, online conference, data show.

- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:	**Head of Department**
أ.د.عاطف أبو شادي	**أ.د.علاء أبو زيد**

Course Contents – Course ILOs Matrix

Teaching and learning methods / ILOs matrix

Course Contents/ Theoritical	**Practical**	**Knowledge and understanding**						**Intellectual**									**Practical**						**Tranferrable**				
Physiology of algae		**A 1**	**A 2**	**A 3**	**A 4**	**A 5**	**A 6**	**B 1**	**B 2**	**B 3**	**B 4**	**B 5**	**B 6**	**B 7**	**B 8**	**B 9**	**C 1**	**C 2**	**C 3**	**C 4**	**C 5**	**C 6**	**D 1**	**D 2**	**D 3**	**D 4**	**D 5**
Modes of nutrition in different algal phyla		√	√				√	√	√	√				√											√	√	√
	Isolation of algae from different sources																√	√	√	√							
Reserve food		√	√				√			√				√												√	√
	Purification of isolated algae 1																√		√	√	√	√					
Chloroplast structure and supramolecular organization of photosynthetic membranes				√	√					√	√												√	√	√	√	√
	Purification																√	√	√	√	√	√					

	of isolated algae 2																										
Photosynthesis		√						√	√	√																√	√
	Different methods of measurement of algal growth																√	√		√	√	√					
Photorespiration (Significant differences between unicellular algae, multicellular algae and higher plants								√	√																	√	√
	Measurement of growth curve by OD																	√	√		√	√					
Effect of light quality on carbon metabolism		√	√						√	√																√	√
	Measurement of growth using																√	√			√	√					

	biomass productivity																										
Assimilation of organic compounds (Acetate and glucose)		√				√	√								√	√							√	√			
	Studying the effect of carbon source on algal growth																	√	√	√	√	√					
Effect of nitrogen and phosphorus nutrition on growth, pigments and photosynthesis				√	√	√					√	√											√				
	Field trip for collection of seaweed																	√	√								
Biosorption of heavy metals and its use in purification of waste water.									√	√													√				

	Studying the effect of organic compounds on algal growth																	√	√	√	√	√					
Oxidative stress						√	√	√					√	√	√	√								√	√	√	√
	Effect of nitrogen and phosphorus nutrition on growth.																√	√	√								
Antioxidative defenses in some algae (antioxidant enzymes and molecules).		√	√	√	√	√	√							√	√	√											
	Oxidative stress caused by H2O2															√	√		√	√	√						
Antimicrobial production from micro algae.		√	√	√				√	√	√	√	√	√	√	√								√	√	√	√	√
	Antimicrobial activity																	√	√	√	√	√					

	by some of the isolated algae																										
Antimicrobial production from seaweeds		√	√	√				√	√	√	√	√	√	√	√					√		√	√	√	√	√	√
	Antimicrobial production from seaweeds																√		√				√				
Assessment		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							√	√	√	√	√
	Assessment																√	√	√	√	√	√					
Phycology																											
What are algae	-	√	√						√	√	√	√	√														√
Algae and the food they make	-	√	√						√					√	√	√										√	√
Algae of streams and rivers	-	√					√					√	√	√												√	√
Methods for studying phytoplanktons	-	√					√					√	√	√												√	√
How algae grow and reproduce	-	√	√	√	√	√	√					√	√	√	√	√										√	√
Cell division in diatoms	-								√	√	√	√	√	√	√	√							√	√	√	√	√
Reproduction units in algae	-	√	√	√	√	√	√	√	√	√	√	√											√	√	√	√	√

Algae of Lakes and ponds	-	√	√	√						√	√	√											√	√	√	√	√
Effect of light on the distribution of algae in Lakes and ponds	-	√	√	√						√	√	√	√	√	√	√							√				√
Effect of nutrients on algae distribution	-	√	√	√						√	√		√	√									√	√	√	√	√
Toxic algae	-	√	√	√									√	√									√				√
How to determine the toxins in water	-	√	√	√									√	√									√	√	√	√	√
Algae as indicators for water quality and pollution	-	√	√	√								√	√	√									√				√
Assessment	-				√	√	√	√	√	√	√	√	√	√									√	√	√	√	√
Physiology of Fungi																											
Spore germination of fungi		√	√				√	√	√	√				√											√	√	√
	Crowded-plate method																√	√	√	√							
Dormancy (exogenous dormancy)		√	√				√			√				√												√	√

	direct-soil-inoculation method (specific antibiotic method)															√		√	√	√	√					
Constitutive dormancy				√	√					√	√											√	√	√	√	√
	Dilution culture method															√	√	√	√	√	√					
Breaking dormancy		√						√	√	√															√	√
	Streak method															√	√		√	√	√					
Stimulatory substances (maturation)								√	√																√	√
	Assay of antibiotics																√	√		√	√					
Heat shock proteins in fungi		√	√						√	√															√	√
	Chemical assay															√	√			√	√					
Cellular effects of heat shock proteins		√				√	√								√	√							√	√			
	Biological assay																√	√	√	√	√					

Heat shock and development				√	√	√					√	√											√				
	Cylinder-plate method																	√	√								
Chitosan and fungi									√	√													√				
	Turbidimetric method																	√	√	√	√	√					
Production of chitosan by fungi						√	√	√					√	√	√	√								√	√	√	√
	All-or none growth method																√	√	√								
Some applications of chitosan		√	√	√	√	√	√							√	√	√											
	Penicilin															√	√		√	√	√						
Fungicides		√	√	√				√	√	√	√	√	√	√	√								√	√	√	√	√
	Seperation and purification of penicillin:																	√	√	√	√	√					
Systemic fungicides		√	√	√				√	√	√	√	√	√	√	√					√		√	√	√	√	√	√
	Properties of penicillin																	√	√	√	√	√					
Selective Topic		√	√	√				√	√	√	√	√	√	√	√								√	√	√	√	√

	Assessment																	√	√	√	√	√					
Virology																											
General features of virus		√	√					√	√	√						√									√	√	√
Factor affecting on transmission of plant virus		√	√					√	√	√	√	√	√			√							√	√	√	√	√
External symptoms of plant virus		√	√					√	√	√	√	√	√			√								√			√
Internal symptoms of plant virus		√	√	√	√	√						√	√			√								√			√
Different method of transmission of plant virus		√	√	√	√	√						√	√			√							√	√	√	√	√
Acquire resist of plant virus		√	√					√	√	√	√	√	√	√	√	√								√	√	√	√
Hepatitis A: structure, epidemiology		√	√	√	√	√	√	√				√	√										√	√	√	√	√

diagnosis, prevention & care																											
Hepatitis B: structure, epidemiology diagnosis, prevention & care		√	√						√	√	√	√	√													√	√
Hepatitis C: structure, epidemiology diagnosis, prevention & care		√	√						√				√													√	√
Interferon		√	√						√	√		√	√										√			√	√
Human immunodeficiency virus(HIV)		√	√						√	√	√	√	√										√			√	√
Causes and type of cancer		√	√	√							√	√	√	√	√								√				√
Development of cancer cell		√	√			√	√	√	√	√					√	√							√	√	√	√	√
Assessment																											

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Formal lecturing.	√	√	√	√	√	√	√					
Supplementary and library research.										√	√	√
Practical sections.								√	√			
external visits and student activities.										√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Assessment methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Written exam	√	√	√	√	√	√	√			√	√	√
Practical exam								√	√	√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Title: Biochemistry of fermentation, Immunology, Plant pathology and Special fungi	Code: 2053
Coordinator	**Prof. Dr. Omyma Awadalla**
Other Staff	**Prof. Dr. Susan Assawah** **Dr.Nanis Allam** **Dr. Eman Abdel Zaher**
Course Delivery	**1st semester: 14 x 2h lectures** **14 x 4h practical** **2nd semester: 14 x 2 lectures** **14 x 4 practical**
Date of approval	**8/2014**

Academic Year : 2014-2015

Professional Information

Course aims:

Provide the students with the fundamental concepts of sucrose and lipid metabolism and related enzymes. Equipped the students with the basis of immunity to bacteria and fungi.Discuss the mechanism of immunology in tumor and viruses.

Identify the defense systems in Plant.Develop the modern experimental approaches in biochemistry of fermentation, selection and preservation of microorganisms and production of useful materials. Classify the different group of fungi and give an account on it's hosts in different habitats. Explore the principles of plant pathology in terms of disease cycle, plant defense against pathogens and methods for controlling plant diseases.

Intended learning outcomes of course (ILOs)

a-Knowledge and understanding:

By the end of the Diploma course the graduate must be able to :-

A1. Define the lipid and protein isolation and purification also, the purification scheme table of enzymes
A2. Describe mechanisms of microbial fatty acids biosynthetic enzyme (FAS), enzyme catalysis.
A3. Explain the Sucrose and lipid metabolism.
A4. Identify the role of plant immunology in production of human vaccines.
A5. Discuss the interaction between the pathogen and host.
A6. Explain the life cycle of certain selected plant diseases.

b- Intellectual skills

By the end of the Diploma course the graduate must be able to :-

B1. Demonstrate purification of enzymes and proteins
B2. Elucidate the enzyme kinetic mechanism
B3. Differentiate between the nature of fatty acids biosynthesis in bacteria

and fungi.

B4. Critically evaluate and discuss the primary literature and topics in particular areas nutrient metabolic different enzymes pathways.

B5. Elucidate new approach in vaccines production and uses and Immunological techniques.

B6. Select the appropriate organism and conditions for best fermentation and product.

B7. Analyze different fungal diseases and demonstrates medicines which could be produced by fungi.

B8. Knowledged about how the pathogen causes disease to plant.

B9. selects the appropriate methods controlling diseases caused to plants

c- Professional and practical skills

By the end of the Diploma course the graduate must be able to :-

C9. Use the proper and more suitable approaches for lipid, protein and enzyme isolation and purifications.

C10. Manipulate and handle the different steps in enzyme kinetics mechanisms elucidation.

C11. Practice the best condition for fermentation and vaccines production.

C12. Explain the principles of and limitation of practical techniques

C13. Use basic laboratory equipment safely

C14. Identify and classify common soil fungi.

C15. Examine the pathogens in terms of how they penetrate the host plant and cause the infection.

C16. Explain the method of pathogen infection in reference to production of enzymes, toxins, growth regulators, and polysaccharides.

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-

D1. Prepare complete and clear scientific reports.

D2. Mention scientific systems and tools effectively

D3. Possess good project management and business skills.

D4. Identify personal learning needs

Contents

1.Biochemistry of fermentation (1 hour / week)	
Week	**Topic**
1	Fementers , history and design of fermenters.
2	Batch fermentation, fed batch fermentation.
3	Continuous fermentation and scale up of fermentation.

4	Methods of culture preservations, criteria for selection of microorganisms for fermentation.
5	Maintenance of cultures.
6	Production of microbial products, methods of strain improvement
7	Recent approaches in microbial production of human recombinant insulin and hepatitis B vaccines.
8	Alcohol production, production of malt beverages.
9	Recent approaches in microbial production of organic acids
10	Recent approaches in microbial production of antibiotics.
11	Recent approaches in microbial production of enzymes.
12	Recent approaches in microbial production of amino acids.
13	Steroid biotransformation.
14	Purification and immobilization of enzymes.
2- Immunoloy (1 hour / week)	
Week	**Topic**
1	Immunity to bacteria and fungi (avoidance of immune system).
2	Tumor immunology (mechanisms of immunity).
3	Tumor immunology (avoidance of immune system).
4	Viral immunology (mechanisms of immunity).
5	Viral immunology (avoidance of immune system).
6	Plant immunology (introduction, different plant defenses).
7	Round up discussion on the topics of the course.
8	Plant immunology (uses of plant immunology in production of human vaccines,….).
9	Vaccination (introduction, traditional production of vaccines).
10	Vaccination (new approach in vaccines production and uses).
11	Immunological techniques (ELISA).
12	Immunological techniques (PCR).

13	Round up discussion on the topics of the course.
14	Assessment
3. special fungi (1 hour / week)	
Week	**Topic**
1	Introduction to fungal symbionts – lichens
2	Mycorrhizae – Ectomycorrhizae.
3	Endomycorrhizae – Non septate and septate fungi.
4	Fungi as insect symbionts.
5	Spore dispersal (by air, water or animals).
6	Fungal ecology (Coprophilous fungi). Fungal ecology (Coprophilous fungi).
7	Amphibious fungi in streams.
8	Aero-aquatic fungi in ponds.
9	Human fungal diseases – cutaneous mycosis.
10	Subcutaneous mycosis.
11	Systemic or deep mycosis – fungi associated with immunocompromised patients
12	Drugs from fungi – Penicillin – cephalosporin.
13	Griseofulvin.
14	Ergot alkaloids.
15	Assessment
4. Phytopathology (1 hour / week)	
Week	**Topic**
1	How pathogen attacks plant.
2	Mechanical forces exerted by pathogens on host tissues.
3	Chemical weapons of pathogens.
4	Microbial toxins in plant diseases.

5	Microbial toxins in plant diseases.
6	Growth regulators in plant diseases.
7	Polysaccharides in plant diseases.
8	How plants defend themselves against pathogens.
9	Structural defenses.
10	Biochemical defenses.
11	Study some plant diseases
12	Study some plant diseases.
13	Control of plant diseases.
14	Assessment

- Practical course

a- special fungi (2 hour / week):-

1-Types of cultures of fungi .

2- Types of slide preparation .

3- Staining

4- Methods of purification of fungi .

5- Methods of biochemical studies of fungi .

6- Methods of isolation of fungi .

7- Preservation of fungi .

8- Identification of fungi .

b-plant pathology (2 hour / week)

1- Methods of studing plant diseases .

2- Studing the characters of plant pathogen .

3- Study the stages of the development of disease on plant .

4- Methods of isolation and purification of pathogen from diseased plants

Teaching, and learning methods:

4.1.Formal lecturing including visual PowerPoint; blackboard, and chalk presentation.
4.2. Supplementary information from internet, and library research.

4.3. Practical sections with good handling practice, and open discussions.

4.4. Independent learning tasks, external visits, and student activities.

Student assessment:

Assessment Method	Skills assessed*	Assessment Length	Schedule	Percentage	Degree
Written exam	K, I, T	2 h.	16^{th} week	60	60
Practical exam	P, T	2 h.	15^{th} week	40	40
Total				100	100

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

List of references

Course notes

Essential books (text books)

- Advances in Fungal Biotechnology for Industry, Agriculture, and Medicine Edited by Tkacz, Jan S.; Lange, Lene Springer 2004

- Dubey and Mahishwari (2006): A Textbook of Microbiology. S.Chand & Company LTD Madigan and Martinko (2006): Brook biology of Microorganisms. 11th edition, Pearson, Prentice Hall.

- Fundamentals of fungi, 2nd ed., Elizabeth Moor-Landecker.

- Fungal Physiology, Second Edition by David H. Griffin, Wiley-Liss, A John Wiley & Sons, Inc, Publication, New York (1994)

- Lecture in botany, royal Holloway collage, university of London, Blackie Glasgow and London distributed in the USA by Chapman and Hall , New York 2000.

- Madigan, Martinko and Parker (2003): Biology of Microorganisms. 10th edition, Pearson, Prentice Hall.

- Methods in Microbiology, C. Booth. Zoosporic fungi in teaching and research,

M.S. Fuller and A. Jaworski.

Recommended books

- Plant pathogens, R. Singh. Virology of flowering plants W. A. Stevens, B. Sc Ph.D. Plant pathology (1969), G. Agrios.

- Fungal Genomics - Applied Mycology and Biotechnology volume 4 Edited by D K Arora and G G Khachatourians Elsevier February 2004

Web sites

http://www.google.com

http://www.cedarville.edu/academics/sciencemath/silvius/3520/352sites.html

www.safarix.com

www.researchnavigator.com

www.prenhall.com/madigan

http://www.who.int/vaccines/intermediate/hepatitis

http://www.who.int/inffs/en/fact 164.html

Facilities required for teaching and learning

-Well prepared laboratory, Lyophilizer, Fermenters, PCR, Cooling ultra centrifuge, Rotatory shaker, Selective culture media, chemicals and kits to do all the experiments required for the course. Culture collection of fungi

- Generic resources, such as the library.

- Electronic copies of past exam papers and example assessments.

- Computer Aided, such as E-mail, online conference, data show.

- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

أ.د/ أميمة عوض الله

Head of Department:

أ.د/ علاء أبوزيد

Course Contents – Course ILOs Matrix

Course contents		Knowlodge and understanding		intellectual			practicals				Trasferable			
Two hours/week	**Labs**	A1	A2	B 1	B 2	B 3	C 1	C2	C3	C4	D1	D 2	D 3	D 4
Introduction to fungal symbionts – lichens		√												
	Types of cultures of fungi .						√	√				√		
Mycorrhizae – Ectomycorrhizae .		√												
	Types of cultures of fungi .						√		√					
Endomycorrhizae – Non septate and septate fungi.		√												
	Types of slide preparation							√				√		
Fungi as insect symbionts.		√												
	Types of slide preparation						√	√	√			√		
Spore dispersal (by air, water or		√												

animals).														
	Staining						√	√				√		
Fungal ecology (Coprophilous fungi). Fungal ecology (Coprophilous fungi).		√												
	Staining						√	√				√		
Amphibious fungi in streams.		√												
	Methods of purificatio n of fungi							√	√					
How plants defend themselves against pathogens.		√												
	Methods of biochemic al studies of fungi .							√	√					
Human fungal diseases – cutaneous mycosis.		√												
	Methods of biochemic al studies of fungi .							√	√	√		√		

Subcutaneous mycosis		√												
	Methods of isolation of fungi							√	√	√		√		
Systemic or deep mycosis – fungi associated with immunocompromised patients		√												
	Methods of isolation of fungi							√						
Drugs from fungi – Penicillin – cephalosporin.		√												
	Preservation of fungi							√	√	√		√		
Griseofulvin.		√												
	Identification of fungi .								√	√		√		
Ergot alkaloids.		√												
	Identification of fungi .							√	√			√		
How pathogen attacks plant.			√	√	√	√								
	. Methods									√				

	of studing plant diseases .													
Mechanical forces exerted by pathogens on host tissues.			√		√	√								
	Methods of studing plant diseases .									√				
Chemical weapons of pathogens.			√	√		√								
	Methods of studing plant diseases .									√				
Microbial toxins in plant diseases.			√	√	√									
	Studing the characters of plant pathogen									√				
Microbial toxins in plant diseases.			√		√									
	Studing the characters of plant pathogen									√				

Growth regulators in plant diseases.			√		√	√								
	Studing the characters of plant pathogen									√				
Polysaccharides in plant diseases.			√	√		√								
	Study the stages of the developm ent of disease on plant									√				
How plants defend themselves against pathogens.			√		√									
	Study the stages of the developm ent of disease on plant									√				
Structural defenses.			√		√									
	Study the stages of the developm ent of disease on plant									√	√			√

Biochemical defenses.			√		√	√								
	Methods of isolation and purification of pathogen from diseased									√			√	√
Study some plant diseases			√	√		√								
	Methods of isolation and purification of pathogen from diseased									√	√			√
Study some plant diseases			√	√	√									
	Methods of isolation and purification of pathogen from diseased									√	√			√
Control of plant diseases.			√		√	√								
	Revision									√	√		√	

Teaching and learning methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Formal lecturing.	√	√	√	√	√	√	√					
Supplementary and library research.										√	√	√
Practical sections.								√	√			
external visits and student activities.										√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Assessment methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Written exam	√	√	√	√	√	√	√			√	√	√
Practical exam								√	√	√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Title: General Bacteriology, Applied Bacteriology, Applied Mycology, Methodology and Instruments used in microbiology and Tanning of leather	Code: 2054
Coordinator	**Prof. Wagih El-Shouny**
Other Staff	**Prof. Wagih El-Shouny** **Prof. M. Yasser Bedaiwy** **Dr. Samia Shabana**
Course Delivery	**1st semester: 14 x 2h lectures** **14 x 4h practical** **2nd semester: 14 x 3 lectures** **14 x 6 practical**
Date of approval	**8/2014**

Academic Year : 2014-2015

Professional Information

Course aims:

-Teach students the modern experimental approaches in bacteriology that reflect the microbial diversity and evolution, in addition to modern techniques used for classification and diagnosis of bacteria.Provide students with the fundamental concepts and principles of microbial mutation basis, polymerase chain reaction, DNA southern blotting, RNA blotting, Western blotting, microbial genes isolation, cloning and expression. In addition to, natural antimicrobial compounds and assessment methods. Learn about Leather industrial tanning process and the roles of microorganisms in this industry. Also, the applications of microbial enzymes in leather treatments.Use of agriculture waste materials for cultivation of edible mushroom and the possible means for biodegradation of colored effluents, in addition to the nature of water pollution with microorganisms.

Intended learning outcomes of course (ILOs)
a-Knowledge and understanding:

By the end of the Diploma course the graduate must be able to :- A1. Define the modern experimental approaches in Microbiology that reflect the diversity on microorganisms and its applications in life. Furthermore, to teach the students the modern software programs for microbiology and evolution A2. Recognize approaches used in microbial genes: isolation, cloning,

expression and antimicrobial drugs

A3. Identify microbial mutation, polymerase reaction, protein, RNA, DNA blotting.

A4. Describe mechanisms of microbial leather treatments and to provide the students with knowledge about microbial enzymes used in that industry

b- Intellectual skills

By the end of the Diploma course the graduate must be able to :-

B1. Critically evaluate the information about the different methods and materials used in microbiology research from a variety of sources

B2. assess the role of microorganism in leather tanning process

B3. Use lingocellulosic residue as a feed and the principles underlying the use of enzymes produced by white-rot fungi for effluent degradation.

B4. plan, execute and present an independent piece of work (e.g. a project) within a supported framework

B5. Execute basic manipulation of biological data (including some statistical analysis if appropriate), and to work safely in a laboratory environment

c- Professional and practical skills

By the end of the Diploma course the graduate must be able to :-

C1. Carry out, handle and analyze data derived from the morphological, biochemical, immunological and molecular data to produce bacterial classification trees.

C2. Use different methods of microbial leather tanning process.

C3. Isolate and propagate microbial mutants in pure form and differentiate between them. Manipulate the microbial genes in vitro

C4. Prepare the substrate and spawn and adjust the proper conditions of solid state fermentation for cultivation of edible mushroom

C5. Identify the pathogenic microorganisms transmitted by water, ensuring the safety of drinking water.

C6. Describe morphological, physiological and biochemical criteria as sources of taxonomic information and their use in bacteria classification

d- General and transferable skills

By the end of the Diploma course the graduate must be able to :-

D1. Work safely, competently and effectively in the laboratory

D2. Independent learning ability required for continuing professional development.

D3. Able to prepare complete and clean scientific report

D4. Ability to work with others, use and manage ideas and information

Contents

1-General bacteriology (1 hour / week)

Week	Topic
1	Microbial phylogeny derived from ribosomal RNA sequences
2	Microbial taxonomy and its relationship to phylogeny
3	Chemotaxonomy (Genomic DNA:DNA hybridization, ribotyping, multilocus sequencing type, and lipid profiling)
4	The species concept in microbiology. Nomenclature and Bergey's Manual
5	Isolation of pathogenic bacteria from clinical specimens (Growth media, blood cultures, urine cultures and fecal cultures)
6	Wounds and Abscesses. Genital specimens and cultures of anaerobes
7	Growth dependent identification methods. Clinical diagnosis
8	Midterm examination
9	Antimicrobial drug susceptibility testing, Safety in Microbiology laboratory, Biological containment and laboratory biosafety levels
10	Immunology and clinical diagnostic methods
11	Immunoassays for infectious diseases
12	Polyclonal and Monoclonal Antibodies, diagnostic and therapeutic uses
13	In Vitro Antigen-Antibody reactions, agglutination and uses in clinical and research laboratories
14	Fluorescent antibodies, Enzyme-linked immunosorbent assay and radioimmunoassay, sensitivity, and diagnostic and research laboratories applications
15	Immunoblot procedure and identification of specific proteins associated with specific pathogen
	Recent Molecular diagnostic methods
	Round up discussion on the topics of the course

Week	Topic
	2-Applied Bacteriology (1 hour / week)
1	Microbiolgical control of plant pathogens

2	Bacteria in food
3	Biomining (Bioleaching)
4	Water treatment
5	Sewage treatment
6	Biological washing powders
7	Silage making and single-cell protein
8	Bioremediation
9	Biodegradation xenobiotics
10	Petroleum Biodegradation
11	Natural gases
12	Microbial plastics
13	Discussion
14	Assessment

3-Applied Mycology (1 hour / week)

Week	Topic
1	Cultivation of edible mushroom: preparation of substrate, spawn and methods of spawning
2	Conditions of solid state fermentation.
3	Biodegradation of colored effluents: enzymes responsible for effluents degradation
4	culture condition and microorganisms for effluents degradation
5	Upgrading of lignocellulosic residue as feed: nutritive value of agricultural waste
6	Digestibility of straw and treatment of straw with white-rot fungi.
7	Assignment
8	Water microbial pollution
9	Water Microbiology: pathogenic microorganisms transmitted by water,
10	Ensuring the safety of drinking water,

11	water pollution
12	water purification
13	Sewage-treatment.
14	Assessment

4-Materials and Methods in microbiology (1 hour / week)

Week	Topic
1	Mutation, mutant detection, mutant selection and carcinogenicity testing.
2	Southern blotting technique,
3	polymerase chain reaction
4	Gene isolation and cloning
5	Gene Probes
6	Cloning vectors
7	Protein Blotting
8	Northern blotting
9	Western blotting
10	Gene expression
11	Expression vectors
12	Assignment
13	Application of genetic engineering
14	Antimicrobial drugs assessment
15	Antibacterial compounds
16	Antifungal compounds

5-Leather Tanning By Microorganisms (1 hour / week)

1	Hydrolytic enzymes

Week	Topic
2	Microbial proteases

3	Microbial collagenases
4	Microbial gelatinases
5	Microbial Lipases
6	Leathers nature
7	Leather tanning process
8	Processing of leather during tanning preparation
9	Protection the processed leather against microbial invaders
10	Preservation of the processed leather against microbial invaders
11	Assignment
12	Microbial problems associating with Leather processing during tanning process at industrial level
13	New approaches for leather processing during tanning process
14	Open discussion

Practical course of general bacteriology (2 hour / week)

a. Isolation of bacteria from different sources.
b. Biochemical identification of isolated bacteria.
c. Molecular identification of bacteria.
d. Isolation of bacteria from different clinical samples.
e. Determination of antimicrobial susceptibility of antibiotics against pathogenic bacteria.
f. Immunological and serological studies of pathogenic bacteria .

Practical course of applied bacteriology (2 hour / week)

1- Isolation of bacteria from different food sources.
2- Isolation and enumeration of bacteria from water by filteration memberane method
3- Isolation of hyperaccumelator bacteria from polluted soil.
4- Extraction of lipase and protease enzymes from bacteria.
5- Determination of antagonistic activitiy of bacteria against plant pathogenic microorganisms.
6- Production of natural gases from bacteria.

Practical course of applied mycology (2 hour / week)

1-Pretreatment of substrate for fungal solid state fermentation (FSSF).
2- Different inoculum type in FSSF.
3- Effect of water content on fungal growth during FSSF.
4-PH requirement of fungal growth during FSSF.
5- Temperature variation and control during FSSF.
6- Different substrate .
7- Factors involved in the selection of a suitable substrate for the desired fungi to grow.

8- Factors affecting spawn preparation.
9- cultivation of edible mushroom.
10- Estimation of digestibility of fermented Lignocellulosics compound.
11- Decolorization of colored effluents.
12- Antimicrobial activity of some fungal pigment .
13- Production of amylase enzyme.
14- Production of protease enzyme.

Teaching, and learning methods:

4.1.Formal lecturing including visual PowerPoint; blackboard, and chalk presentation.
4.2. Supplementary information from internet, and library research.

4.3. Practical sections with good handling practice, and open discussions.

4.4. Independent learning tasks, external visits, and student activities.

Student assessment:

Assessment Method	Skills assessed*	Assessment Length	Schedule	Percentage	Degree
Written exam	K, I, T	2 h.	16th week	60	60
Practical exam	P, T	2 h.	15th week	40	40
Total				100	100

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

List of references

Course notes

Essential books (text books)

Microbiology: Bacteriology v. 2 (Blackwell Underground Clinical Vignettes) by Vikas Bhushan, Tao Le, and Vishal Pall (Paperback - 1 May 2005)

Recombinant DNA by Watson, J.D., Gilman, M., Witkowski, J. and Zoller, M. (1992), Scientific American Books distributed by W.H. Freeman and Company, New York, USA

Advances in Fungal Biotechnology for Industry, Agriculture, and Medicine Edited by Tkacz, Jan S.; Lange, Lene Springer 2004 Advances in Fungal Biotechnology for Industry, Agriculture,

and Medicine
Edited by Tkacz, Jan S.; Lange, Lene
Springer 2004

Madigan and Martinko (2006): Brook biology of Microorganisms. 11th edition, Pearson, Prentice Hall.

Dubey and Mahishwari (2006): A Textbook of Microbiology. S. Chand & Company LTD

Recommended books

Molecular Genetics of Bacteria (Hardcover) by Larry Snyder, Wendy Champness 2002

Modern Microbial Genetics by Uldis N. Streips and Ronald E. Yasbin (Hardcover - Feb 7, 2002)

An Overview on Toxigenic Fungi and Mycotoxins in Europe
Edited by Antonio Logrieco and Angelo Visconti
Springer 2004

Fungal Genomics - Applied Mycology and Biotechnology volume 4
Edited by D K Aurora and G G Khachatourians
Elsevier February 2004

Madigan, Martinko and Parker (2003): Biology of Microorganisms. 10th edition, Pearson, Prentice Hall.

Madigan, Martinko and Parker (2000): Biology of Microorganisms. 9th edition, Pearson, Prentice Hall.

Dubey and Mahishwari (2004): A Textbook of Microbiology. S.Chand & Company LTD Dubey and Mahishwari (2003): A Textbook of Microbiology. S.Chand & Company LTD

Web sites

http://www.accessexcellence.org/RC/genetics.htm

http://www.oxfordjournals.org

http://www.cedarville.edu/academics/sciencemath/silvius/3520/352sites.html

www.safarix.com

www.researchnavigator.com

Facilities required for teaching and learning

- Well prepared laboratory, Lyopholizer, ELISA reader, PCR, Fluorescent Microscope, - Selective culture media, chemicals and kits to examine all the tests required for the course - Course web page, digital camera as tool for active learning - Generic resources, such as the library. - Electronic copies of past exam papers and example assessments. - Computer Aided, such as E-mail, online conference, data show. - Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

أ.د/ وجيه مصطفي الشوني

Head of Department:

أ.د/ علاء أبوزيد

Course Contents – Course ILOs Matrix																				
Course Contents	**Weeks**																			
		Knowledge and understanding				**Intellectual**						**Practical**					**Tranferrable**			
General bacteriology		A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4
Microbial phylogeny derived from ribosomal RNA sequences	1	√	√									√							√	√
	Isolation of bacteria from different sources										√	√								
Microbial taxonomy and its relationship to phylogeny	2	√	√									√							√	√
	Biochemical identification of isolated bacteria											√		√	√					
Chemotaxonomy (Genomic DNA:DNA	3	√	√									√							√	√

, multilocus sequencing type, and lipid profiling)																				
	Molecular identification of bacteria											√	√	√	√					
The species concept in microbiology. Nomenclature and Bergey's Manual	4	√	√	√								√							√	√
	Isolation of bacteria from different clinical samples					√						√		√	√					
Isolation of pathogenic bacteria from clinical specimens (Growth media, blood cultures, urine cultures and fecal cultures)	5	√							√	√	√	√							√	√

Wounds and Abscesses. Genital specimens and cultures of anaerobes	5	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Determination of antimicrobial susceptibility of antibiotics against pathogenic bacteria									√		√	√	√	√					
Growth dependent identification methods. Clinical diagnosis	6	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Immunological and serological studies of pathogenic bacteria											√	√	√		√				
Midterm examination	7	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Antimicrobial drug susceptibility	7	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

testing, Safety in Microbiology laboratory, Biological containment and laboratory biosafety levels																				
Immunology and clinical diagnostic methods	8	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Immunoassays for infectious diseases	8	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Polyclonal and Monoclonal Antibodies, diagnostic and therapeutic uses	9	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
In Vitro Antigen-Antibody reactions, agglutination and uses in clinical and research laboratories	10	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fluoresce	11	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

nt antibodies, Enzyme-linked immunosorbent assay and radioimmunoassay, sensitivity, and diagnostic and research laboratories applications																				
Immunoblot procedure and identification of specific proteins associated with specific pathogen	12	√	√	√	√	√	√								√	√	√	√	√	√
Recent Molecular diagnostic methods	13	√	√	√	√	√	√								√	√	√	√	√	√
Round up discussion on the topics of the course	14	√	√	√	√	√	√								√	√	√	√	√	√
Microbial phylogeny derived from ribosomal																				

RNA sequences																				
Applied Bacteriology		√									√	√	√	√	√	√	√	√	√	√
Microbiological control of plant pathogens	1	√									√	√					√	√	√	√
	Isolation of bacteria from different food sources											√	√	√		√				
Bacteria in food	2	√									√	√					√	√	√	√
	Isolation and enumeration of bacteria from water by filteration membrane method										√	√		√						
Biomining (Bioleaching)	3	√									√	√					√	√	√	√
	Isolation of hyperaccumelator bacteria from polluted										√	√	v	√						

	soil																			
Water treatment	4	√									√	√					√	√	√	√
	Extraction of lipase and protease enzyme from bacteria										√		√	√	√					
Sewage treatment	5	√	√	√	√						√	√					√	√	√	√
	Determination of antagonistic activity of bacteria against plant pathogenic microorganisms										√		√		√	√				
Biological washing powders	6	√	√	√	√						√	√	√	√	√	√	√	√	√	√
	Production of natural gasese from bacteria																			
Silage making and single-cell protein	7	√					√	√	√	√										√
Bioremed	8	√	√	√	√	√	√	√	√	√	√									√

iation																				
Biodegradation xenobiotics	9	√	√				√	√	√	√	√									√
Petroleum Biodegradation	10	√	√				√	√	√	√	√									√
Natural gases	11	√	√				√	√	√	√	√									√
Microbial plastics	12	√	√				√	√	√	√	√									√
Discussion	13																			
Assessment	14	√	√														√	√	√	√
Applied Mycology															√	√	√	√	√	√
Cultivation of edible mushroom: preparation of substrate, spawn and methods of spawning	1	√	√	√	√	√														√
	Pretreatment of substrate for FSSF										√	√	√	√						
Conditions of solid state fermentat	2	√	√	√	√	√														√

ion.																				
	Effect of water content on fungal growth during FSSF									√	√	√		√						
Biodegradation of colored effluents: enzymes responsible for effluents degradation	3	√	√	√	√	√														√
	PH requirement of fungal growth during FSSF									√	√	√	√	√						
culture condition and microorganisms for effluents degradation	4	√	√	√	√	√														√
	Temperature variation and control during FSSF								√	√	√	√	√	√						
Upgrading of lignocellulosic residue as	5	√												√	√	√	√	√	√	√

feed: nutritive value of agricultural waste																				
	Different substrate								√	√	√	√								
Digestibility of straw and treatment of straw with white-rot fungi.	6	√												√	√	√	√	√	√	√
	Factors involved in the selection of a suitable substrate for the desireds fungi to grow									√	√	√		√						
Assignment	7	√			√	√	√	√	√	√	√								√	√
	Cultivation of edible mushroom								√	√		√		√						
Water microbial pollution	8	√			√	√	√	√	√	√	√								√	√
	Effect of water content on fungal growth during FSSF							√			√		√	√						

Water Microbiology: pathogenic microorganisms transmitted by water,	9	√	√							√	√								√	√
	FACTORS AFFECTING SPAWN PREPARATION							√	√		√		√							
Ensuring the safety of drinking water,	10	√	√							√	√								√	√
	Estimation of digestibility of fermented lingo cellulosis is compound								√		√		√							
water pollution	11	√	√							√	√								√	√
	Decolorization of colored effluents								√		√		√							
water purification	12																			
	Antimicrobial activity of some									√	√		√							

	fungal pigment																			
Sewage-treatment .	13																			
	Production of amylase enzyme																			
Assessment	14	√	√	√							√	√	√	√						
	Production of protease enzyme										√	√		√						
Materials and Methods		√	√	√							√	√	√	√						
Mutation, mutant detection, mutant selection and carcinogenicity testing.	1	√	√	√							√	√	√	√						
Southern blotting technique ,	2	√	√	√										√						
polymerase chain reaction	3	√	√	√										√						
Gene isolation and cloning	4	√											√	√	√	√	√	√	√	√
Gene	5	√											√	√	√	√			√	√

Probes																				
Cloning vectors	6	√											√	√	√	√			√	√
Protein Blotting	7	√											√	√	√	√			√	√
Northern blotting	8	√	√	√	√	√	√							√	√	√			√	√
Western blotting	9	√	√	√	√	√	√							√	√	√				√
Gene expression	10	√	√	√	√	√	√							√	√	√				√
Expression vectors	11	√												√	√	√				√
Assignment	12	√											√	√	√	√				√
Application of genetic engineering	13	√											√	√	√	√				√
Antimicrobial drugs assessment	14	√											√	√	√	√				√
Antibacterial compounds	15	√											√	√	√	√				√
Antifungal compounds	16	√											√	√	√	√	√	√	√	√
Leather Tanning By Microorganisms																				
Microbial	1	√						√	√	√	√									√

proteases																				
Microbial collagenases	2	√						√	√	√	√									√
Microbial gelatinases	3	√						√	√	√	√									√
Microbial Lipases	5	√						√			√									√
Leathers nature	6	√	√	√	√	√	√	√			√									√
Leather tanning process	7	√									√	√	√	√	√					
Processing of leather during tanning preparation	8	√									√	√	√	√	√					
Protection the processed leather against microbial invaders	9	√									√	√	√	√	√					
Preservation of the processed leather against microbial invaders	10	√									√									
Assignment	11	√						√	√	√	√					√	√	√	√	√
Microbial problems associating with	12	√						√	√	√	√					√	√	√	√	√

Leather processing during tanning process at industrial level																				
New approaches for leather processing during tanning process	13	√						√	√	√	√					√	√	√	√	√
Open discussion	14	√	√	√	√	√	√	√	√	√	√					√	√	√	√	√
Assessement	15																			

7. Teaching and learning methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Formal lecturing.	√	√	√	√	√	√	√					
Supplementary and library research.										√	√	√
Practical sections.								√	√			
external visits and student activities.										√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

8. Assessment methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3

Written exam	√	√	√	√	√	√	√			√	√	√
Practical exam								√	√	√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Title: **Biostatistics**	Code: 1518
Coordinator	**Professor Kamal Shaltout**
Other Staff	**Prof. Dr/ M. Ezzat Abdel Monssef**
Course Delivery	**1st semester: 14 x 1h lectures** **14 x 2h practical** **2nd semester: 14 x 1 lectures**
Date of approval	**8/2014**

Academic Year : 2014-2015

Professional Information

Course aims:

- Achieve a comprehensible form of the too much data that characterizes the modern biological research.Apply statistical tests for evaluating differences, variations and associations between populations and their significance in probability terms.Teach the students the modern software programs for statistical analysis and to interpret and make inferences from analysis of set of observations sampled from a population. Find out the best possible experimental design that provides the best sorting out of the controlled and uncontrolled variations.

Intended learning outcomes of course (ILOs)

a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Identify the role of the biostatistics in the procedure of the biological scientific research.

A2. Recognize the association between variables in normal and non-normal distributed populations (correlations and regressions).

A3. Compare between each pair of treatments in multi-treatment experiments

A4. Explain the tests of significance of difference between two or more than two sampled populations.

A5. Discuss the application, advantages and disadvantages of the different types of experimental designs.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-	
B11.	Differentiate between the characteristics of the different types of distributions
B12.	Demonstrate the principles and approaches underlying current methods of biostatistics and its application using computer software programs
B13.	Apply the best suitable statistical tests for the different biological experiments
B14.	Design suitable experimental
B15.	Analyze the results statistically

c- Professional and practical skills

By the end of the Diploma course the graduate must be able to :-
C17. Perform the best suitable statistical tests for the different biological experiments
C18. Provide the statistical consultation for the students and researchers of biology.
C19. Prepare the suitable experimental design and how to analyze the results statistically

d- General and transferable skills

By the end of the Diploma course the graduate must be able to :-
D13. Use databases and library search methods as well as internet sites
D14. Independent learning ability required for continuing professional development
D15. Work with others, use and manage ideas and information .
D16. Demonstrate written and verbal communication skills on modern approaches

Contents

Week	Topic (1 hour / week)
1	Introduction about Biostatistics as a tool of scientific research
2	Sampling of attributes
3	Frequency and probability distributions
4	Normal distribution
5	Binomial distribution
6	Frequency and probability distributions
7	Normal distribution and Binomial distribution
8	Poisson distribution
9	Tests of significance
10	Round-up discussion on the previous topics

11	Partial examination
12	Introductory note on analysis of variance
13	Data transformations, One-way analysis of variance
14	Some basic experimental designs (completely random, randomized complete block and Latin square designs)
15	Two-way analysis of variance
16	Split-plot experimental design Split-plot experimental design
17	Least significant difference (LSD)
28	Least significant range (LSR) tests
29	Simple linear regression
20	Simple linear regression
21	Rank correlation
22	Curve fitting
23	method of least squares
24	Multiple correlation, regression and analysis of time series
25	Multiple regression
26	Analysis of time series
27	Round up discussion on the previous topics
28	Round up discussion on the previous topics

Teaching, and learning methods:

4.1.Formal lecturing including visual PowerPoint; blackboard, and chalk presentation.
4.2. Supplementary information from internet, and library research.

4.3. Practical sections with good handling practice, and open discussions.

4.4. Independent learning tasks, external visits, and student activities.

Student assessment:

Assessment Method	Skills assessed*	Assessment Length	Schedule	Percentage	Degree
Written exam	K, I, T	2 h.	16^{th} week	60	60

Practical exam	P, T	2 h.	15^{th} week	40	40
Total				100	100

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

List of references

Course notes

Essential books (text books)

Zar, J. H. 1984. Biostatistical Analysis: Second Edition. Prentice Hall, Inc., New Jersy, USA

Snedecor, G. W. & Cochran, W. G. 1967. Satistical Methods. The Iowa State University Press, Iowa, USA.

Zar, J. H. 1984. Biostatistical Analysis: Second Edition. Prentice Hall, Inc., New Jersy, USA

Snedecor, G. W. & Cochran, W. G. 1967. Satistical Methods. The Iowa State University Press, Iowa, USA.

Recommended books

Voelkl, K. E. & Gerber, S. B. 1999. ***Using SPSS for Windows: Data Analysis and Graphics*.** Springer, New York, USA.

Stephens, L. J. 1998. ***Beginning Statistics***. Schaum's Outline Series, McGraw-Hill. New York, USA.

Web sites

www.google.com

http://www.accessexcellence.org/RC/genetics.htm

www.researchnavigator.com

Facilities required for teaching and learning

- Generic resources, such as the library.

- Electronic copies of past exam papers and example assessments.

- Computer Aided, such as E-mail, online conference, data show.

- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

أ.د/ كمال حسين شلتوت

Head of Department:

أ.د/ علاء مصطفى أبو زيد

Course Contents –

Course ILOs Matrix

Course Contents	**Weeks**	**Knowledge and understanding**					**Intellectual**				**Practical**						**Tranferrable**			
		A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4
Introduction about Biostatistics as a tool of scientific research	1	√	√	√										√	√	√	√	√	√	√
Sampling of attributes	2	√	√	√										√	√	√	√	√	√	√
Frequency and probability distributions	3	√	√	√										√					√	√
Normal distribution	4	√	√	√					√	√	√	√	√	√					√	√
Binomial distribution	5	√	√	√					√	√	√	√	√	√					√	√
Frequency and probability distributions	5	√	√	√	√	√														
Normal distribution and Binomial distribution	6	√	√	√	√					√	√	√	√	√			√	√	√	√
Poisson distribution	7	√	√	√	√					√	√	√	√	√			√	√	√	√
Tests of significance	7	√	√	√	√					√	√	√	√	√			√	√	√	√
Round-up discussion on the previous topics	8	√	√	√	√	√							√	√			√	√	√	√
Partial examination	8	√				√							√	√	√	√	√	√	√	√
Introductory note on analysis	9	√				√	√	√	√	√								√	√	√

of variance																				
Data transformations, One-way analysis of variance	10	√				√	√	√	√	√								√	√	√
Some basic experimental designs (completely random, randomized complete block and Latin square designs)	11	√				√	√	√	√	√								√	√	√
Two-way analysis of variance	12	√									√	√	√	√	√	√	√	√	√	√
Split-plot experimental design Split-plot experimental design	13	√									√	√	√						√	√
Least significant difference (LSD)	14	√									√	√	√						√	√
Least significant range (LSR) tests	15																			
Simple linear regression	16	√									√	√	√						√	√
Simple linear regression	17	√	√	√	√	√	√								√	√	√	√	√	√
Rank correlation	18	√	√	√	√	√	√								√	√	√	√	√	√
Curve fitting	19	√	√	√	√	√	√								√				√	√
method of least squares	20	√	√												√				√	√
Multiple correlation, regression and analysis of time series	21	√	√					√	√	√	√	√	√	√	√				√	√
Multiple regression	22	√	√	√								√	√	√	√				√	√

Analysis of time series	23	√	√	√								√	√	√	√	√	√	√	√	√
Round up discussion on the previous topics	24	√	√	√								√	√							√
Round up discussion on the previous topics	25	√	√	√						√	√	√	√							√
Introduction about Biostatistics as a tool of scientific research	26	√	√	√						√	√	√	√							√
Sampling of attributes	27	√	√	√						√	√	√						√	√	√
Frequency and probability distributions	28	√	√						√	√	√	√						√	√	√

Teaching and learning methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Formal lecturing.	√	√	√	√	√	√	√					
Supplementary and library research.										√	√	√
Practical sections.								√	√			
external visits and student activities.										√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Assessment methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Written exam	√	√	√	√	√	√	√			√	√	√
Practical exam								√	√	√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

M.Sc. Programme
of
Microbiology

Tanta University, Faculty of Science

M. Sc. program specifications of Microbiology

Program parent Department	Botany Department
Academic year	2013/2014
Date of specification approval	8/2014

A- Basic Information

Program title:	M. Sc. Degree in Microbiology.
Program type	Single.
Coordinator:	Head of Botany Department.
QAA Benchmarking Standards	Academic Reference Standards (ARS)
Date of Delivery	Every year in June.
Review Date	Internal Periodic Review, every Summer

B- Professional Information

1. Program aims

To understand main aspects of microbiology, learn modern microbiological techniques, provide intense hands-on training in different microbiological fields including taxonomy, physiology and genetics, explore theory and practice of microbiology population, characterize and arranging microorganisms in an orderly manner, improve theoretical and practical fundaments of microbial cell and pathogenic microorganisms, and know the basic statistical procedures used to analyze data

2. Intended Learning outcomes

A. Knowledge and understanding:

At the end of this module students should have acquired knowledge and understanding of the underlying concepts and principles of**:**

A32. Microorganisms (Fungi, Bacteria, Algae and viruses) biology
A33. Different microbiological basis and methods, and chemistry of microbial enzymes and nutrients metabolism.
A34. Microbial Genetics, applied microbiology, microbial fermentation, instruments used in microbiology field and immunology
A35. Microbial population taxonomy
A36. Microbial Cell structure and culture techniques
A37. IT and basic statistical procedures used to analyze data

B. Intellectual skills:

At the end of this module students should have acquired the ability to :

B11. Think logically and organize tasks into a structured form.

B12. Assimilate knowledge and ideas in microbiology field based on wide reading and through the internet.

B13. Understand the evolving state of knowledge in a rapidly developing research area in microbiology field.

B14. Construct and test hypothesis.

B15. Plan, conduct and write a report on an independent research project

C. Professional and practical skills

At the end of this module students should have acquired the following skills:

C30. Conduct basic techniques and methods to the studies and research in microbiology.

C31. Be able prepare written protocols for experimental procedures and collect and interpret data from experimental observations and measurements within their work in different microbiology specific area

C32. Be able to design and conduct individual and shared research projects both in the laboratory and in the field.

C33. Be able to use computer software and web sites and other forms of information technology for data collection, analysis and presentations

D. General and transferable skills:

D50. Work in a team and be able to cooperate with others

D51. Demonstrate microbial written and verbal communication skills using IT in work and in life

D52. Have knowledge of accounting and management.

D53. Ability to manage time and resources

D54. Present ideas and arguments in a structured manner

E. Teaching and learning

Knowledge will be developed through

4. Lectures
5. Practicals

F. Assessment

A wide variety of assessment methods are used

1. Written exam.

2. Practical exam.

3. Academic standards

The Academic Reference Standards for the award of master in Microbiology As well as the attributes and capabilities of the graduate This programme gives an opportunity to:

- Provide students with the main basic and updated concepts of microbiology at advanced level.
- Deliver students with a broad understanding of the fundamental principles of Microbiology emphasizing Fungi, Bacteriology and Virology and its impact on human, animals and plants
- Study the diverse aspects of the field of microbiology, including biochemistry, ecology, genetics, molecular biology, pathogenicity, phylogeny, industrial application of microorganisms in different fields.
- Equip students with IT.

3.A External references for standards (Benchmarks):

In order to fulfill international standards, our students should acquire

I. Knowledge and Understanding:

Approaches to study and forms of subject knowledge likely to be common to all bioscience degree programmes will include the following:

- knowledge and understanding of the processes and mechanisms of life
    - From molecular to cellular.
    - From Organism to community.
- engagement with the essential facts, major concepts, principles and theories associated with the chosen discipline.
- understanding of information and data, and their setting within a theoretical framework.
- familiarity with the:
    - Terminology.
    - Nomenclature.
    - Classification systems as appropriate.
- Methods of acquiring, interpreting and analysing biological. information with a critical understanding of the appropriate contexts for their use through the:
    - Study of texts.
    - Original papers.
    - Reports and data sets.

- Developing knowledge about the diversity of life and its evolution.
- Knowledge of a range of practical techniques and methodologies, including :
    - Data analysis.
    - Use of statistics.
- Engagement with current developments in the biosciences and their applications, and the philosophical and ethical issues involved.
- The applicability of the biosciences to the careers to which graduates will be progressing.

II. Skills

G. Generic skills

- an appreciation of the complexity and diversity of life processes through the study of organisms, their molecular, cellular and physiological processes, their genetics and evolution, and the interrelationships between them and their environment.
- the ability to read and use appropriate literature with a full and critical understanding.
- the capacity to give a clear and accurate account of a subject.
- critical and analytical skills: a recognition that statements. should be tested and that evidence is subject to assessment and critical evaluation.
- the ability to employ a variety of methods of study in investigating, recording and analyzing material.
- the ability to think independent, set tasks and solve problems.

H. Key skills

The specific key skills that should be developed in bioscience degree courses are subdivided into:-

1. Intellectual skills

- Recognising and applying subject-specific theories, concepts or principles. For example:
    - The relationship between genes and proteins.
    - The nature of essential nutrients in microbes, cells, plants and animals;
- Analyzing and summarizing information critically, including published research or reports;
- Obtaining and integrating several lines of subject-specific evidence to formulate and test hypotheses;
- Applying subject knowledge and understanding to address familiar and unfamiliar problems

2. Practical skills

- Designing, planning, conducting and reporting on investigations. The data may be obtained through:
    - individual
    - group projects
- Obtaining, recording, collecting and analyzing data using appropriate techniques in the field and/or laboratory, working by themselves or in a group
- Undertaking field and/or laboratory investigations of living systems in a responsible, safe and ethical manner. For example, Students must pay due attention to risk assessment, relevant health and safety regulations, and respect for animal & plant life
- In some Bioscience degrees, graduates will learn to respect rights of access, for example:-

\- In field work or in order to map the genes of a community, family or group of plants or animals, including humans. They should show sensitivity to the impact of investigations on:

  - the environment.

  - the organisms under investigation.

  - other stakeholders.

- Preparing, processing, interpreting and presenting data, using appropriate qualitative and quantitative techniques:

  - Statistical programmes.

  - Spreadsheets.

  - Programs for presenting data visually.

- Solving problems by a variety of methods including the use of computers.
- Using the internet and other electronic sources critically as a means of communication and a source of information.

3. Interpersonal and teamwork skills

- Identifying individual and collective goals and responsibilities and performing in a manner appropriate to these roles;
- Recognising and respecting the views and opinions of other team members;
- Negotiating skills;
- Evaluating performance as an individual and a team member; evaluating the performance of others;

- Developing an appreciation of the interdisciplinary nature of science and of the validity of different points of view.
-
-

4. Self-management and professional development skills

- Developing the skills necessary for self-managed and lifelong learning (e.g. working independent, time management and organisation skills);
- Identifying and working towards targets for personal, academic and career development;
- Developing an adaptable, flexible, and effective approach to study and work.

3.B-Comparison of provision to external references:

International Academic Standards (NARS)

- Although the provision is quite comparable to its benchmark there are a number of points that should be highlighted for the purpose of achieving advancement in the specifications and qualities of the Microbiology program at Botany Department, Faculty of Science, Tanta University as follows:
- Searching for new antimicrobial compounds, microbial genetic diversity and microbial enzymes applications.
- Skill of performing diverse laboratory techniques of molecular biology important in the improving quality and quantity of crops yield and controlling plant pathogens should be stressed upon. Furthermore, skills of performing Laboratory food analysis to evaluate the food mycological toxin as health dangerous agent should be addressed.
- Microbiology Diploma students should acquire proper skills to keep up with the microbiological literature and to appreciate the need for life-long continuing education, starting the day after their graduation.
- Students should have the aptitude of critical evaluation, synthesis and interpretation of botanical information and data, production of botany-specific scientific documentation, and presentation of botanical information and arguments clearly and correctly in writing and orally, to both specialist and lay audiences.

4.a.Program duration: One academic year (2 semesters).

4.b.Program Structure:

All applicants admitted to the master's program are required to study 6 selected theoretical courses and one practical course approved by the department council from the master courses offered by the department for one academic year. A part of the M.Sc. courses offered by the Botany Department, the student should study a course in English language for a minimum one hour per week. Albeit, students who have taken equivalent English language course may be exampled from it upon the recommendation of the Faculty Council.

No. of hours per week: 12 Lectures and 6 hours practical

The registration for the preliminary year takes place in October, and the final exam. Is held once a year (June) in the date approved by the Faculty Council.

Grade Assessment:

Final Written Exam.60%

Final Practical Exam 40%

*< 60% failed

60-64 passed, 65-79 good, 80-89 very good, >90% excellent

*Failed students can repeat the course (s) only once.

5. Program Contents

N	Code	Course Name	Lecturer
1	2052	Phycology, Physiology of algae, physiology of fungi	Prof. Dr. Atef Abo-Shady Dr. Abdel-Fattah Abo Mohra Prof. Dr.: Alaa Abou Zeid
2	1542	Biochemistry, Fermentation, Immunology,	Prof. Dr. Essam Abo Kassem Prof. Dr. Metwally Abdel-Azeem Prof. Dr. Nanis Allam
	2053	Phytopathology, special fungi, virology	Prof. Dr.: Omyma Awadalla Prof. Dr.: Susan Assawah Dr.: Samia Shabana
3	2054	General bacteriology, applied bacteriology, applied mycology, instrumental methods of microbiology, use of microorganisms in leather tanning	Prof. Dr. Wagih El-Shouny Prof. Dr. Essam Azab Prof. Dr. M. Yasser Bedaiwy Prof. Dr.: Hanan Mubarak
5	1518	Biostatistics	Prof. Dr. Kamal Shaltout Dr. Mohamed Abdelmonsef

Course Name	Code No	Contents
Phycology, Physiology of algae, physiology of fungi	2052	The basic principles and core of what are algae and how they live, reproduce and cultivation How to identify algae of lakes, soils, streams and ponds as well as marine algae.Exploring the fundamental principles of fungal physiology especially spore germination, with reference to dormancy, constitutive dormancy, exogenous dormancy, enzyme complement and biosynthetic process during spore

		germination.
Biochemistry, Fermentation, Immunology,	1542	Provide the students with the fundamental concepts of sucrose and lipid metabolism and related enzymes. Equipped the students with the basis of immunity to bacteria and fungi.
Phytopathology, special fungi, virology	2053	Discuss the mechanism of immunology in tumor and viruses. Identify the defense systems in Plant.Develop the modern experimental approaches in biochemistry of fermentation, selection and preservation of microorganisms and production of useful materials. Classify the different group of fungi and give an account on it's hosts in different habitats. Explore the principles of plant pathology in terms of disease cycle, plant defense against pathogens and methods for controlling plant diseases. Understand the feature, molecular structure, transmission and diagnosis of many of viral diseases.
General bacteriology, applied bacteriology, applied mycology, instrumental methods of microbiology, use of microorganisms in leather tanning	2054	Teach students the modern experimental approaches in bacteriology that reflect the microbial diversity and evolution, in addition to modern techniques used for classification and diagnosis of bacteria.Provide students with the fundamental concepts and principles of microbial mutation basis, polymerase chain reaction, DNA southern blotting, RNA blotting, Western blotting, microbial genes isolation, cloning and expression. In addition to, natural antimicrobial compounds and assessment methods. Learn about Leather industrial tanning process and the roles of microorganisms in this industry. Also, the applications of microbial enzymes in leather treatments.Use of agriculture waste materials for cultivation of edible mushroom and the possible means for biodegradation of colored effluents, in addition to the nature of water pollution with microorganisms.

Biostatistics	1518	Statistical definitions, sampling of attributes, distributions (Normal, Binomial, Poisson), and tests of significance, Part two: Analysis of variance, experimental designs, association between variables, curve fitting and the method of least square, multiple and partial correlation and regressions, and analysis of time series.

6-Thesis

- The thesis of M.Sc. program is a formal written document representing sustained research into an important intellectual issue. The thesis must be an independent effort which contributes to the accumulated understanding of the field in which it is written. The required research preparation and advanced research methods courses will help the student to focus his or her research effort, and provide general guidelines for research approach and report preparation. Thesis will be reviewed and approved by the candidate's supervising professor and external academic review committee.
- The thesis should contain at least the following:
- Title page (title, name of student, university, faculty, name of program, date, supervisors).
- Table of contents.
- Introduction, containing a definition of the thesis statement, working method, the theoretical framework, and the aim.
- Literature review.
- Materials and methods.
- Results
- Discussion and conclusions.
- References.
- Language of the thesis: The thesis must be written in English language accompanied by a summary in Arabic.
- Formation of Examiners Committees.
- A committee is selected by botany Department Council. The M.Sc. Degree is awarded to the applicant by University, upon the recommendation of the department and the Faculty Council.
- Program Admission Requirements:
- An applicant for admission to the M.Sc. program in Microbiology should hold a B.Sc. degree in Microbiology with a minimum grade of (Good = 70%).

- The candidate should pass successfully :
- Courses of pre-master academic year
- Written Thesis

- Oral Presentation
- Defense
- At least one published paper

Formation of Examiners Committees

A committee is selected by Botany Department Council. The M.Sc. Degree is awarded to the applicant by University, upon the recommendation of the department and the Faculty Council.

7-Admission:

An applicant for admission to the master's program should hold Botany B.Sc. degree in science either major with a minimum grade "Good" or double major with a minimum general grade "Good" from any Egyptian or equivalent institute. In addition, all applicants must satisfy the department graduate admission.

8- Evaluation of programme intended learning outcomes

Evaluator	Tool	Sample
1 Alumni	Questionnaire	
2- Stakeholders (Employers)	Questionnaire	
3- External Evaluator(s)	Report	

Program coordinator:

Prof. Dr.: Alaa Abou-Zeid

Head of Department:

Prof. Dr.: Alaa Abou-Zeid

Date: 8/2014

M. Sc. program Microbiology matrix

Course Title	Course code	***Knowledge and understanding***						***Intellectual skills***					***practical skills***				***General and transferable skills***				
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5
Algae, Physiology of Algae, Physiology of fungi	2052	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Biochemistry, Biochemistry of fermentation, Immunology	1542				√	√		√			√	√	√		√			√		√	
Phytopathology, special fungi, virology	2053	√	√	√	√	√	√					√	√		√			√	√	√	√
General Bacteriology, Applied Bacteriology, Applied Mycology, Method	2054	√			√	√		√			√				√	√	√		√	√	√

ology and Instruments used in microbiology and Tanning of leather																					
Biostatistics	15 18				√	√		√	√					√	√			√	√	√	√

Title: **Algae, Physiology of Algae, Physiology of fungi**	Code: 2052
Coordinator	**Prof. Dr. Alaa M. Abou Zeid**
Other Staff	**Prof. Atef Abo Shady** **Drof. Abdel Fattah Abo mohra**
Course Delivery	**1st semester: 14 x 2h lectures** **14 x 4h practical** **2nd semester: 14 x 1 lectures** **14 x 2 practical**
Date of approval	**8/2014**

Academic Year : 2014-2015

Professional Information

Course aims:

The basic principles and core of what are algae and how they live, reproduce and cultivation. How to identify algae of lakes, soils, streams and ponds as well as marine algae. Exploring the fundamental principles of fungal physiology especially spore germination, with reference to dormancy, constitutive dormancy, exogenous dormancy, enzyme complement and biosynthetic process during spore germination. Understand the feature, molecular structure, transmission and diagnosis of many of viral diseases.

Intended learning outcomes of course (ILOs)
a-Knowledge and understanding:

By the end of the Diploma course the graduate must be able to :-

A.1- Identify the Characteristics of algae.

A.2- recognizes the essential enzymes required for growth and metabolism.

A.3. List the role of Algae in microbiological activities and in water quality.

A.4 Identify the structure of some diseased viruses plants changes.

A5- List the symptoms of viral infection and human diseases and diagnosis of them

A6 - Recognize the different methods for Viruses Prevention and its control

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-

B11. analyze microbiological information from a variety of sources
B12. Categorize the principles, underlying fungi metabolism and different nutrients metabolic regulatory circuits.
B13. Explain the basis of fungi transformation process.
B14. Demonstrate the principles of fungal physiology in a manner appropriate to their programme of study.
B15. Illustrate using algae as biomarkers and indicators for water pollution.
B16. distinguish the effect of algae on our life
B7. Differentiate between the different symptoms of plant virus infection.

B8. Illustrate the method of transmission of different types of hepatitis and HIV.

B9. Critically evaluates and discusses the primary literature and topics in virology.

c- Professional and practical skills

By the end of the M. Sc. course the graduate must be able to :-

C11. Differentiate between the different groups of fungi and algae under microscope
C12. Determine pathways of some essential products produced by fungi and algae
C13. Use different methods for fungi laboratory manipulation.
C14. manage strategy for fungi metabolism and transformation processes by fungi
C15. use statistics to evaluate the efficiency of different methods used in that field
C16. carry out laboratory work

d- General and transferable skills

By the end of the Diploma course the graduate must be able to :-

D6. prepare of a research proposal
D7. prosecute of research by applications of laboratory or field techniques
D8. Prepare complete and clear scientific report
D9. Draw the micro-organisms
D10. Possess good project management and business skills.

Contents

Physiology of algae (1 hour / week)	
Week	**Topic**
1	Modes of nutrition in different algal phyla
2	Reserve food
3	Chloroplast structure and supramolecular organization of photosynthetic membranes
4	Photosynthesis
5	Photorespiration (Significant differences between unicellular algae, multicellular algae and higher plants
6	Effect of light quality on carbon metabolism
7	Assimilation of organic compounds (Acetate and glucose)
8	Effect of nitrogen and phosphorus nutrition on growth, pigments and photosynthesis
9	Biosorption of heavy metals and its use in purification of waste water.
10	Oxidative stress
11	Antioxidative defenses in some algae (antioxidant enzymes and molecules).
12	Antimicrobial production from micro algae.
13	Antimicrobial production from seaweeds
14	Exopolysaccharides and its role
15	Spirulina and its medical uses
Physiology of Fungi (1 hour / week)	
Week	**Topic**
1	Spore germination of fungi
2	Dormancy (exogenous dormancy)
3	Constitutive dormancy
4	Breaking dormancy

5	Stimulatory substances (maturation)
6	Heat shock proteins in fungi
7	Cellular effects of heat shock proteins
8	Heat shock and development
9	Chitosan and fungi
10	Production of chitosan by fungi
11	Some applications of chitosan
12	Fungicides
13	Systemic fungicides
14	Selective Topic
15	Uptake and translocation and mechanism of systemic fungicides action.
Phycology (1 hour / week)	
Week	**Topic**
1	What are algae
2	Algae and the food they make
3	Algae of streams and rivers
4	Methods for studying phytoplanktons
5	How algae grow and reproduce
6	Cell division in diatoms
7	Reproduction units in algae
8	Algae of Lakes and ponds
9	Effect of light on the distribution of algae in Lakes and ponds
10	Effect of nutrients on algae distribution
11	Toxic algae
12	How to determine the toxins in water
13	Algae as indicators for water quality and pollution

14	Genetic engineering of algae
15	Assessment
16	Transformation of algae
Virology (1 hour / week)	
Week	**Topic**
1	General features of virus
2	Factor affecting on transmission of plant virus
3	External symptoms of plant virus
4	Internal symptoms of plant virus
5	Different method of transmission of plant virus
6	Acquire resist of plant virus
7	Hepatitis A: structure, epidemiology diagnosis, prevention & care
8	Hepatitis B: structure, epidemiology diagnosis, prevention & care
9	Hepatitis C: structure, epidemiology diagnosis, prevention & care
10	Interferon
11	Human immunodeficiency virus(HIV)
12	Causes and type of cancer
13	Development of cancer cell

Practical

Algae and physiology of algae(4 hour / week)	
Week	**Topic**
1	Isolation of algae from different sources
2	Purification of isolated algae 1
3	Purification of isolated algae 2
4	Different methods of measurement of algal growth
5	Measurement of growth curve by OD
6	Measurement of growth using biomass productivity
7	Studying the effect of carbon source on algal growth
8	Field trip for collection of seaweed
9	Studying the effect of organic compounds on algal growth
10	Effect of nitrogen and phosphorus nutrition on growth.
11	Oxidative stress caused by H_2O_2
12	Antimicrobial activity by some of the isolated algae
13	Antimicrobial production from seaweeds
14	Assessment
Physiology of Fungi(2 hour / week)	
Week	**Topic**
1	Crowded-plate method
2	direct-soil- inoculation method (specific antibiotic method)
3	Dilution culture method
4	Streak method
5	Assay of antibiotics
6	Chemical assay
7	Biological assay
8	Cylinder-plate method

9	Turbidimetric method
10	All-or none growth method
11	Penicilin
12	Seperation and purification of penicillin:
13	Properties of penicillin
14	Assessment

4. Teaching, and learning methods:

4.1.Formal lecturing including visual PowerPoint; blackboard, and chalk presentation.
4.2. Supplementary information from internet, and library research.

4.3. Practical sections with good handling practice, and open discussions.

4.4. Independent learning tasks, external visits, and student activities.

5. Student assessment:

Assessment Method	Skills assessed*	Assessment Length	Schedule	Percentage	Degree
Written exam	K, I, T	2 h.	16th week	60	60
Practical exam	P, T	2 h.	15th week	40	40
Total				100	100

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

List of references

Course notes

Essential books (text books)

- Fungal Physiology, Second Edition by David H. Griffin, Wiley-Liss, A John Wiley & Sons, Inc, Publication, New York (1994)

- Advances in Fungal Biotechnology for Industry, Agriculture, and Medicine
Edited by Tkacz, Jan S.; Lange, Lene
Springer 2004

Recommended books

- Fungal Genomics - Applied Mycology and Biotechnology volume 4
Edited by D K Arora and G G Khachatourians

Elsevier February 2004.

- Algal Ecology, Freshwater benthic ecosystems, Edited by Stevenson, R.J., Bothwell, M.L., Lowe R.L. Academic Press (1996)
- Algal culturing techniques, Edit Anderson, R.A., Elsivier (2005)

Virology of flowering plants W. A. Stevens, B. Sc Ph.D.

Lecture in botany, royal Holloway collage, university of London, Blackie

Glasgow and London distributed in the USA by Chapman and Hall , New York 2000

Web sites

- http://www.who.int/vaccines/intermediate/hepatitis. Accessed February 15, 2006
- http://www.who.int/inffs/en/fact 164.html. Accessed February 15, 2006
- http://www.google.de/
- www. Algaebase.com

Facilities required for teaching and learning

- Generic resources, such as the library.

- Electronic copies of past exam papers and example assessments.

- Computer Aided, such as E-mail, online conference, data show.

- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

أ.د/ علاء مصطفى أبو زيد

Head of Department:

أ.د/ علاء مصطفى أبوزيد

Date: 8\2014

Course Contents – Course ILOs Matrix

Course Contents/ Theoritical	Practical	Knowledge and understanding						Intellectual									Practical						Tranferrable				
Physiology of algae		A 1	A 2	A 3	A 4	A 5	A 6	B 1	B 2	B 3	B 4	B 5	B 6	B 7	B 8	B 9	C 1	C 2	C 3	C 4	C 5	C 6	D 1	D 2	D 3	D 4	D 5
Modes of nutrition in different algal phyla		√	√				√	√	√	√				√											√	√	√
	Isolation of algae from different sources																√	√	√	√							
Reserve food		√	√				√			√				√												√	√
	Purification of isolated alg																√		√	√	√	√					

	ae 1																										
Chloroplast structure and supramolecular organization of photosynthetic membranes				√	√					√	√												√	√	√	√	√
	Purification of isolated algae 2																√	√	√	√	√	√					
Photosynthesis		√						√	√	√																√	√
	Different methods of measurement																√	√		√	√	√					

	of algal growth																										
Photorespiration (Significant differences between unicellular algae, multicellular algae and higher plants								√	√																	√	√
	Measurement of growth curve by OD																	√	√		√	√					
Effect		√	√						√	√																√	√

of light quality on carbon metabolism																											
	Measurement of growth using biomass productivity															√	√			√	√						
Assimilation of organic compounds (Acetate and glucose)		√				√	√								√	√							√	√			
	Studying the effect																√	√	√	√	√						

	of carbon source on algal growth																										
Effect of nitrogen and phosphorus nutrition on growth, pigments and photosynthesis				√	√	√					√	√											√				
	Field trip for collection of seaweed																	√	√								
Bio									√	√													√				

sorption of heavy metals and its use in purification of waste water.																											
	Studying the effect of organic compounds on algal growth																√	√	√	√	√						
Oxidative stress						√	√	√					√	√	√	√								√	√	√	√
	Effect of nitrogen an															√	√	√									

	d phosphorus nutrition on growth.																										
Antioxidative defenses in some algae (antioxidant enzymes and molecules).		√	√	√	√	√	√							√	√	√											
	Oxidative stress caused by H_2O_2															√	√		√	√	√						
Antimicrobial production		√	√	√				√	√	√	√	√	√	√	√								√	√	√	√	√

from microalgae.																											
	Antimicrobial activity by some of the isolated algae																	√	√	√	√	√					
Antimicrobial production from seaweeds		√	√	√				√	√	√	√	√	√	√	√					√		√	√	√	√	√	√
	Antimicrobial production from seaweeds																√		√				√				
Assessme		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√							√	√	√	√	√

nt																											
	Assessment																√	√	√	√	√	√					
Phycology																											
What are algae	-	√	√						√	√	√	√	√														√
Algae and the food they make	-	√	√						√					√	√	√										√	√
Algae of streams and rivers	-	√					√					√	√	√												√	√
Methods for studying phytoplanktons	-	√					√					√	√	√												√	√
How algae grow and reproduce	-	√	√	√	√	√	√					√	√	√	√	√										√	√
Cell	-								√	√	√	√	√	√	√	√							√	√	√	√	√

division in diatoms																											
Reproduction units in algae	-	√	√	√	√	√	√	√	√	√	√	√											√	√	√	√	√
Algae of Lakes and ponds	-	√	√	√						√	√	√											√	√	√	√	√
Effect of light on the distribution of algae in Lakes and ponds	-	√	√	√						√	√	√	√	√	√	√							√				√
Effect of nutrients on algae distribution	-	√	√	√						√	√		√	√									√	√	√	√	√
Toxic alga	-	√	√	√									√	√									√				√

e																											
How to determine the toxins in water	-	√	√	√								√	√								√	√	√	√	√
Algae as indicators for water quality and pollution	-	√	√	√							√	√	√								√				√
Assessment	-				√	√	√	√	√	√	√	√	√	√								√	√	√	√	√
Physiology of Fungi																											
Spore germination of fungi		√	√				√	√	√	√				√										√	√	√
	Crowded-plate method																√	√	√	√							
Dorma		√	√				√			√				√											√	√

ncy (exogenous dormancy)																											
	direct-soil-inoculation method (specific antibiotic method)																√		√	√	√	√					
Constitutive dormancy				√	√					√	√												√	√	√	√	√
	Dilution culture method																√	√	√	√	√	√					
Breaking dormancy		√						√	√	√																√	√
	Str																√	√		√	√	√					

	eak method																										
Stimulatory substances (maturation)								√	√																	√	√
	Assay of antibiotics																	√	√		√	√					
Heat shock proteins in fungi		√	√						√	√																√	√
	Chemical assay																√	√			√	√					
Cellular effects of heat shock proteins		√				√	√								√	√							√	√			
	Biologica																	√	√	√	√	√					

	l assay																										
Heat shock and development				√	√	√					√	√											√				
	Cylinder-plate method																	√	√								
Chitosan and fungi									√	√													√				
	Turbidimetric method																	√	√	√	√	√					
Production of chitosan by fungi						√	√	√					√	√	√	√								√	√	√	√
	All-or none growth metho																√	√	√								

	d																										
Some applications of chitosan		√	√	√	√	√	√							√	√	√											
	Penicilin															√	√		√	√	√						
Fungicides		√	√	√				√	√	√	√	√	√	√	√								√	√	√	√	√
	Seperation and purification of penicillin:																	√	√	√	√	√					
Systemic fungicides		√	√	√				√	√	√	√	√	√	√	√					√		√	√	√	√	√	√
	Properties of penicillin																	√	√	√	√	√					
Selective Topic		√	√	√				√	√	√	√	√	√	√	√								√	√	√	√	√
	Asses																	√	√	√	√	√					

	sm ent																										

Teaching and learning methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Formal lecturing.	√	√	√	√	√	√	√					
Supplementary and library research.										√	√	√
Practical sections.								√	√			
external visits and student activities.										√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Assessment methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Written exam	√	√	√	√	√	√	√			√	√	√
Practical exam								√	√	√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Title: Biochemistry, Biochemistry of fermentation, Immunology	Code: 1542
Coordinator	**Prof. Dr. Metwally Abdel Azeem Metwally**
Other Staff	**Prof. Dr. Essam Abou Kassem** **Prof. Nanis Allam**
Course Delivery	**1st semester: 14 x 1h lectures** **14 x 2h practical** **2nd semester: 14 x 2 lectures** **14 x 4 practical**
Date of approval	**8/2014**

Academic Year : 2014-2015

Professional Information

Course aims:

1. Provide the students with the fundamental concepts of sucrose and lipid metabolism and related enzymes.
2. Equipped the students with the basis of immunity to bacteria and fungi
3. Discuss the mechanism of immunology in tumor and viruses
4. Identify the defense systems in Plant
5. Develop the modern experimental approaches in biochemistry of fermentation, selection and preservation of microorganisms and production of useful materials.
6. Classify the different group of fungi and give an account on it's hosts in different habitats.
7. Explore the principles of plant pathology in terms of disease cycle, plant defense against pathogens and methods for controlling plant diseases.

Intended learning outcomes of course (ILOs)
a-Knowledge and understanding:

By the end of the Diploma course the graduate must be able to :-

A7. Define the lipid and protein isolation and purification also, the purification scheme table of enzymes

A8. Describe mechanisms of microbial fatty acids biosynthetic enzyme (FAS), enzyme catalysis.

A9. Explain the importance of antioxidants, their identification and extraction sources.

A10. Identify the role of plant immunology in production of human vaccines.
A11. Discuss the interaction between the pathogen and host.
A12. Explain the life cycle of certain selected plant diseases.

b- Intellectual skills

By the end of the Diploma course the graduate must be able to :-

B10. Demonstrate purification of enzymes and proteins
B11. Elucidate the enzyme kinetic mechanism
B12. Differentiate between the nature of fatty acids biosynthesis in bacteria and fungi.
B13. Critically evaluate and discuss the primary literature and topics in particular areas nutrient metabolic different enzymes pathways.
B14. Elucidate new approach in vaccines production and uses and Immunological techniques.
B15. Select the appropriate organism and conditions for best fermentation and product.
B16. Analyze different fungal diseases and demonstrates medicines which could be produced by fungi.
B17. Knowledged about how the pathogen causes disease to plant.
B18. selects the appropriate methods controlling diseases caused to plants

c- Professional and practical skills

By the end of the Diploma course the graduate must be able to :-

C20. Use the proper and more suitable approaches for lipid, protein and enzyme isolation and purifications.
C21. Manipulate and handle the different steps in enzyme kinetics mechanisms elucidation.
C22. Practice the best condition for fermentation and vaccines production.
C23. Explain the principles of and limitation of practical techniques
C24. Use basic laboratory equipment safely
C25. Identify and classify common soil fungi.
C26. Examine the pathogens in terms of how they penetrate the host plant and cause the infection.
C27. Explain the method of pathogen infection in reference to production of enzymes, toxins, growth regulators, and polysaccharides.

d- General and transferable skills

By the end of the M. Sc. course the graduate must be able to :-

D5. Prepare complete and clear scientific reports.

D6.	Mention scientific systems and tools effectively
D7.	Possess good project management and business skills.
D8.	Identify personal learning needs

Contents

1.Biochemistry	
Week	**Topic**
1	Free radicals.
2	Antioxidants.
3	Antioxidant, purpose, types and classification.
4	Antioxidant, sources, founds, antioxidants nutrients.
5	Ascorbic acid (vitamin c) definition, chemistry, mechanism and determination.
6	Vitamin E, α-tecopherol, physiological role toxicity, importance absorbtion and mechanism.
7	Carotene, nomenclature, molecular structure, food source function and toxicity.
8	Selenium: indicator plants, toxicity, accumulation in plants, benefits.
9	Midterm exam.
10	Glutathion (GSH) :biosynthesis, function in animals and plants, methods of determination.
11	Antioxidant enzyme:catalase, where is found, cellular role,factors affecting activity, distribution, hydrogen peroxide.
12	Superoxide:synthesis, basic reaction, structure, superoxide in biology.
13	Superoxide dismutase: types,biochemistry, physiology, role containing oxidative stress.
14	Revision.
2- Immunoloy	
Week	**Topic**

1	Immunity to bacteria and fungi (avoidance of immune system).
2	Tumor immunology (mechanisms of immunity).
3	Tumor immunology (avoidance of immune system).
4	Viral immunology (mechanisms of immunity).
5	Viral immunology (avoidance of immune system).
6	Plant immunology (introduction, different plant defenses).
7	Round up discussion on the topics of the course.
8	Plant immunology (uses of plant immunology in production of human vaccines,....).
9	Vaccination (introduction, traditional production of vaccines).
10	Vaccination (new approach in vaccines production and uses).
11	Immunological techniques (ELISA).
12	Immunological techniques (PCR).
13	Round up discussion on the topics of the course.
14	Assessment

Week	**Topic**
1	Fementers , history and design of fermenters
2	Batch fermentation, fed batch fermentation
3	Continuous fermentation and scale up of fermentation
4	Methods of culture preservations, criteria for selection of microorganisms for fermentation
5	Maintenance of cultures
6	Production of microbial products, methods of strain improvement
7	Recent approaches in microbial production of human recombinant insulin and hepatitis B vaccines

8	Midterm examination
9	Alcohol production, production of malt beverages
10	Recent approaches in microbial production of organic acids
11	Recent approaches in microbial production of antibiotics
12	Recent approaches in microbial production of enzymes
13	Recent approaches in microbial production of amino acids, Steroid biotransformation
14	Biotechnology of dairy products, Production of Baker's yeast

Laboratories

1- **Biochemistry (two hours /week)**

Lab 1 Paper chromatography of amino acids.
Lab 2 Estimation of sugar by Nelson soln.
Lab 3 Invertase enzyme .
Lab 4 Dehydrogenase enzyme.
Lab 5 Catalase enzyme.

2-immunology

(two hours/week)

Lab 1 Treatment of experimental Animal protocol

Lab 2 Immunization routs

Lab 3 Bleeding Techniques and collection of samples

lab 4 Suggested routes of active immunization against bacterial challenge

Lab 5 Continue experiment

Lab 6 Analysis of immunological parameters and writing a report

Lab 7 Revision and quiz

Lab 8 Practical Applications of Immunology(Vaccines ,Diagnostic tests)

Lab 9	Continue
Lab 10	Induced resistance in plant
Lab 11	Detection of Measurable parameters during plant defense
Lab 12	continue and writing a report
Lab 13	Comparison between measurable parameters in animal and plant
Lab 14	revision

Teaching, and learning methods:

4.1.Formal lecturing including visual PowerPoint; blackboard, and chalk presentation.
4.2. Supplementary information from internet, and library research.

4.3. Practical sections with good handling practice, and open discussions.

4.4. Independent learning tasks, external visits, and student activities.

Student assessment:

Assessment Method	Skills assessed*	Assessment Length	Schedule	Percentage	Degree
Written exam	K, I, T	2 h.	16th week	60	60
Practical exam	P, T	2 h.	15th week	40	40
Total				100	100

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

List of references

Course notes

Essential books (text books)

- Advances in Fungal Biotechnology for Industry, Agriculture, and Medicine
Edited by Tkacz, Jan S.; Lange, Lene
Springer 2004

- Dubey and Mahishwari (2006): A Textbook of Microbiology. S.Chand & Company LTD Madigan and Martinko (2006): Brook biology of Microorganisms. 11th edition, Pearson, Prentice Hall.

- Fundamentals of fungi, 2nd ed., Elizabeth Moor-Landecker.

- Fungal Physiology, Second Edition by David H. Griffin, Wiley-Liss, A John Wiley & Sons, Inc, Publication, New York (1994)

- Lecture in botany, royal Holloway collage, university of London, Blackie Glasgow and London distributed in the USA by Chapman and Hall , New York 2000.

- Madigan, Martinko and Parker (2003): Biology of Microorganisms. 10th edition, Pearson, Prentice Hall.

- Methods in Microbiology, C. Booth. Zoosporic fungi in teaching and research, M.S. Fuller and A. Jaworski.

Recommended books

- Plant pathogens, R. Singh. Virology of flowering plants W. A. Stevens, B. Sc Ph.D. Plant pathology (1969), G. Agrios.

- Fungal Genomics - Applied Mycology and Biotechnology volume 4
Edited by D K Arora and G G Khachatourians
Elsevier February 2004

Web sites

http://www.google.com

http://www.cedarville.edu/academics/sciencemath/silvius/3520/352sites.html

www.safarix.com

www.researchnavigator.com

www.prenhall.com/madigan

http://www.who.int/vaccines/intermediate/hepatitis

http://www.who.int/inffs/en/fact 164.html

Facilities required for teaching and learning

-Well prepared laboratory, Lyophilizer, Fermenters, PCR, Cooling ultra centrifuge, Rotatory shaker, Selective culture media, chemicals and kits to do all the experiments required for the course. Culture collection of fungi

- Generic resources, such as the library.

- Electronic copies of past exam papers and example assessments.

- Computer Aided, such as E-mail, online conference, data show.

- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

أ.د/ متولى عبد العظيم متولى

Head of Department:

أ.د/ علاء مصطفى أبوزيد

Course Contents – Course ILOs Matrix

Course Contents		Knowledge and understanding					Intellectual								Practical							Transferable				
1- Biochemistry Two hours /week	**Labs**	A 1	A 2	A 3	A 4	A 5	B 1	B 2	B 3	B 4	B 5	B 6	B 7	B 8	C 1	C 2	C 3	C 4	C	C	C	D 1	D 2	D 3	D 4	
Free radicals	1	√																								
	Paper chromatography of amino acids	√																				√				
Antioxidants	2	√																								
	Estimation of sugar by Nelson soln.	√														√						√				
Antioxidan	3	√															√					√	√			

ts, purpose, types,classification																										
	Invertase enzyme	√															√				√	√				
Antioxidant, sources, founds, antioxidant nutrients	4	√																				√				
	Dehydrogenase enzyme.	√	√					√	√													√				
Ascorbic acid , definition, chemistry, mechanism and determination	5	√																								

	Catalase enzyme.	√						√	√								√						√			
Vitamin E, α-tecopherol, physiological role toxicity,importance	6		√																			√				
			√						√	√												√				
Carotene nomenclature, molecular structure, food source function and toxicity	7		√		√	√												√				√			√	
Selenium :indicator	8				√				√	√									√					√		

plant, toxicity ,accumulation in plants, benefits																										
Midterm exam	9									√							√			√						
(GSH): Biosynthesis, function in animals and plants, methods of determination.		√			√			√											√							
Catalase:where is found, cellular role, factor	10	√				√						√										√		√		

s affecting activity, distribution, hydrogen peroxide																										
Superoxide:synthesis, basic reaction, structure, peroxide in biology	11,12	√		√			√														√					
Superoxide dismutase : types biochemistry, physiology, rolw containing oxidative stres	13,14	√		√				√	√												√		√			

s																										
2-Immunology (two hours/week)																										
Introduction	1												√													
	Treatment of experimental Animal protocol																			√						
Immunity to	2				√								√									√				

bacteria and fungi (mechanisms of immunity)																										
	Immunization routs																			√						
Immunity to bacteria and fungi (avoidance of immune system)	3				√										√							√				
	Bleeding Techniques and collection of samples																		√	√	√					
Tumor immunology (mechanisms of immu	4				√																				√	

nity)																										
	Suggested routes of active immunization against bacterial challenge															√	√									
Tumor immunology (avoidance of immune system)	5				√																					
	Continue experiment															√										
viral immunology (mechanisms of immunity)	6				√																					
	Analysis of															√										

	immunological parameters and writing a report																									
viral immunology (avoidance of immune system)	7														√	√						√		√	
	Revision and quiz																									
Plant immunology (introduction, different plant defenses)	8					√										√								√	
	Practical Applications of Immunol																√			√					

	ogy(Vaccines ,Diagnostic tests)																									
Midterm examination	9																									
Plant immunology (uses of plant immunology in production of human vaccines,….)	10				√																√			√		
	continue																									
Vaccination (introduction ,traditional production of vaccin	11																									

es)																										
	Induced resistance in plant																			√						
Vaccination (new approach in vaccines production and uses)	12				√			√																√	√	
	Detection of Measurable parameters during plant defense																			√	√					
Immunological techniques (ELISA, PCR)	13			√	√			√														√				
	continue and																	√	√							

	writing a report																									
Immunological tolerance	14				√					√													√			
	Comparison between measurable parameters in animal and plant															√	√		√	√						
3.Biochemistry of fermentation																										
Fementers , history and design of fermenters	1	√	√											√									√	√	√	
Batch fermentation, fed	2			√	√			√						√							√			√		

batch fermentation																										
Continuous fermentation and scale up of fermentation	3	√		√					√													√				
Methods of culture preservations, criteria for selection of microorganisms for fermentation	4					√					√										√			√		
Maintenance of cultures	5		√			√															√				√	
Production of microbial products,	6				√																			√		

methods of strain improvement																										
Recent approaches in microbial production of human recombinant insulin and hepatitis B vaccines	7		√																		√			√		
Midterm examination	8			√				√																√		
Alcohol production, production of malt beverages	9	√					√																			
Recent appro	10		√				√	√																√		

aches in microbial production of organic acids																										
Recent approaches in microbial production of antibiotics	11	√			√		√					√										√				
Recent approaches in microbial production of enzymes	12		√					√	√				√											√		
Recent approaches in microbial production of	13	√	√	√	√																		√	√		

amino acids, Steroid biotransformation																										
Biotechnology of dairy products, Production of Baker's yeast	14	√			√						√	√	√													

Teaching and learning methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Formal lecturing.	√	√	√	√	√	√	√					
Supplementary and library research.										√	√	√
Practical sections.								√	√			
external visits and student activities.										√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Assessment methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Written exam	√	√	√	√	√	√	√			√	√	√
Practical exam								√	√	√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Title: General Bacteriology, Applied Bacteriology, Applied Mycology, Methodology and Instruments used in microbiology and Tanning of leather	Code: 2054
Coordinator	**Prof. Dr. Wagih El-shouny**
Other Staff	**Prof Dr Essam Azzab** **Prof. Dr M. Yasser Bedaiwy** **Prof. Dr. Hanan Mubarak**
Course Delivery	**1st semester: 14 x 2h lectures** **14 x 4h practical** **2nd semester: 14 x 3 lectures** **14 x 6 practical**
Date of approval	**8/2014**

Academic Year : 2014-2015

Professional Information

Course aims:

Teach students the modern experimental approaches in bacteriology that reflect the microbial diversity and evolution, in addition to modern techniques used for classification and diagnosis of bacteria.Provide students with the fundamental concepts and principles of microbial mutation basis, polymerase chain reaction, DNA southern blotting, RNA blotting, Western blotting, microbial genes isolation, cloning and expression. In addition to, natural antimicrobial compounds and assessment methods. Learn about Leather industrial tanning process and the roles of microorganisms in this industry. Also, the applications of microbial enzymes in leather treatments. Use of agriculture waste materials for cultivation of edible mushroom and the possible means for biodegradation of colored effluents, in addition to the nature of water pollution with microorganisms.

Intended learning outcomes of course (ILOs)
a-Knowledge and understanding:

By the end of the Diploma course the graduate must be able to :-
A5. Define the modern experimental approaches in Microbiology that reflect the diversity on microorganisms and its applications in life. Furthermore, to teach the students the modern software programs for microbiology and evolution
A6. Recognize approaches used in microbial genes: isolation, cloning, expression and antimicrobial drugs
A7. Identify microbial mutation, polymerase reaction, protein, RNA, DNA blotting.
A8. Describe mechanisms of microbial leather treatments and to provide the students with knowledge about microbial enzymes used in that industry

b- Intellectual skills

By the end of the Diploma course the graduate must be able to :-
B6. Critically evaluate the information about the different methods and materials used in microbiology research from a variety of sources
B7. assess the role of microorganism in leather tanning process
B8. Use lingocellulosic residue as a feed and the principles underlying the use of enzymes produced by white-rot fungi for effluent degradation.
B9. plan, execute and present an independent piece of work (e.g. a project) within a supported framework
B10. Execute basic manipulation of biological data (including some statistical analysis if appropriate), and to work safely in a laboratory environment

c- Professional and practical skills

By the end of the Diploma course the graduate must be able to :-
C7. Carry out, handle and analyze data derived from the morphological, biochemical, immunological and molecular data to produce bacterial classification trees.
C8. Use different methods of microbial leather tanning process.
C9. Isolate and propagate microbial mutants in pure form and differentiate between them. Manipulate the microbial genes in vitro
C10. Prepare the substrate and spawn and adjust the proper conditions of solid state fermentation for cultivation of edible mushroom
C11. Identify the pathogenic microorganisms transmitted by water, ensuring the safety of drinking water.

C12. Describe morphological, physiological and biochemical criteria as sources of taxonomic information and their use in bacteria classification

d- General and transferable skills

By the end of the Diploma course the graduate must be able to :-
D5. Work safely, competently and effectively in the laboratory D6. Independent learning ability required for continuing professional development. D7. Able to prepare complete and clean scientific report D8. Ability to work with others, use and manage ideas and information

Contents

1-General bacteriology(1 hour / week)

Week	Topic
1	Microbial phylogeny derived from ribosomal RNA sequences
2	Microbial taxonomy and its relationship to phylogeny
3	Chemotaxonomy (Genomic DNA:DNA hybridization, ribotyping, multilocus sequencing type, and lipid profiling)
4	The species concept in microbiology. Nomenclature and Bergey's Manual
5	Isolation of pathogenic bacteria from clinical specimens (Growth media, blood cultures, urine cultures and fecal cultures)
6	Wounds and Abscesses. Genital specimens and cultures of anaerobes
7	Growth dependent identification methods. Clinical diagnosis
8	Midterm examination
9	Antimicrobial drug susceptibility testing, Safety in Microbiology laboratory, Biological containment and laboratory biosafety levels
10	Immunology and clinical diagnostic methods
11	Immunoassays for infectious diseases

12	Polyclonal and Monoclonal Antibodies, diagnostic and therapeutic uses
13	In Vitro Antigen-Antibody reactions, agglutination and uses in clinical and research laboratories
14	Fluorescent antibodies, Enzyme-linked immunosorbent assay and radioimmunoassay, sensitivity, and diagnostic and research laboratories applications
15	Immunoblot procedure and identification of specific proteins associated with specific pathogen
	Recent Molecular diagnostic methods
	Round up discussion on the topics of the course

2-Applied Bacteriology(1 hour / week)

Week	Topic
1	Microbiolgical control of plant pathogens
2	Bacteria in food
3	Biomining (Bioleaching)
4	Water treatment
5	Sewage treatment
6	Biological washing powders
7	Silage making and single-cell protein
8	Bioremediation
9	Biodegradation xenobiotics
10	Petroleum Biodegradation
11	Natural gases
12	Microbial plastics
13	Discussion
14	Assessment

3-Applied Mycology(1 hour / week)

Week	Topic

1	Cultivation of edible mushroom: preparation of substrate, spawn and methods of spawning
2	Conditions of solid state fermentation.
3	Biodegradation of colored effluents: enzymes responsible for effluents degradation
4	culture condition and microorganisms for effluents degradation
5	Upgrading of lignocellulosic residue as feed: nutritive value of agricultural waste
6	Digestibility of straw and treatment of straw with white-rot fungi.
7	Assignment
8	Water microbial pollution
9	Water Microbiology: pathogenic microorganisms transmitted by water,
10	Ensuring the safety of drinking water,
11	water pollution
12	water purification
13	Sewage-treatment.
14	Assessment

4-Materials and Methods(1 hour / week)

Week	Topic
1	Mutation, mutant detection, mutant selection and carcinogenicity testing.
2	Southern blotting technique,
3	polymerase chain reaction
4	Gene isolation and cloning
5	Gene Probes
6	Cloning vectors
7	Protein Blotting

8	Northern blotting
9	Western blotting
10	Gene expression
11	Expression vectors
12	Assignment
13	Application of genetic engineering
14	Antimicrobial drugs assessment
15	Antibacterial compounds
16	Antifungal compounds

5-Leather Tanning By Microorganisms(1 hour / week)

Week	Topic
1	Hydrolytic enzymes
2	Microbial proteases
3	Microbial collagenases
4	Microbial gelatinases
5	Microbial Lipases
6	Leathers nature
7	Leather tanning process
8	Processing of leather during tanning preparation
9	Protection the processed leather against microbial invaders
10	Preservation of the processed leather against microbial invaders
11	Assignment
12	Microbial problems associating with Leather processing during tanning process at industrial level
13	New approaches for leather processing during tanning process
14	Open discussion

Practical course of general bacteriology(2 hour / week)

g. Isolation of bacteria from different sources.
h. Biochemical identification of isolated bacteria.
i. Molecular identification of bacteria.
j. Isolation of bacteria from different clinical samples.
k. Determination of antimicrobial susceptibility of antibiotics against pathogenic bacteria.
l. Immunological and serological studies of pathogenic bacteria .

Practical course of applied bacteriology(2 hour / week)

1- Isolation of bacteria from different food sources.
2- Isolation and enumeration of bacteria from water by filteration memberane method
3- Isolation of hyperaccumelator bacteria from polluted soil.
4- Extraction of lipase and protease enzymes from bacteria.
5- Determination of antagonistic activitiy of bacteria against plant pathogenic microorganisms.
6- Production of natural gases from bacteria.

Practical course of applied mycology(2 hour / week)

1-Pretreatment of substrate for fungal solid state fermentation (FSSF).
2- Different inoculum type in FSSF.
3- Effect of water content on fungal growth during FSSF.
4-PH requirement of fungal growth during FSSF.
5- Temperature variation and control during FSSF.
6- Different substrate .
7- Factors involved in the selection of a suitable substrate for the desired fungi to grow.
8- Factors affecting spawn preparation.
9- cultivation of edible mushroom.
10- Estimation of digestibility of fermented Lignocellulosics compound.
11- Decolorization of colored effluents.
12- Antimicrobial activity of some fungal pigment .
13- Production of amylase enzyme.
14- Production of protease enzyme.

Teaching, and learning methods:

4.1.Formal lecturing including visual PowerPoint; blackboard, and chalk presentation.

4.2. Supplementary information from internet, and library research.

4.3. Practical sections with good handling practice, and open discussions.

4.4. Independent learning tasks, external visits, and student activities.

Student assessment:

Assessment Method	Skills assessed*	Assessment Length	Schedule	Percentage	Degree
Written exam	K, I, T	2 h.	16th week	60	60
Practical exam	P, T	2 h.	15th week	40	40
Total				100	100

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

List of references

Course notes

Essential books (text books)

Microbiology: Bacteriology v. 2 (Blackwell Underground Clinical Vignettes) by Vikas Bhushan, Tao Le, and Vishal Pall (Paperback - 1 May 2005)

Recombinant DNA by Watson, J.D., Gilman, M., Witkowski, J. and Zoller, M. (1992), Scientific American Books distributed by W.H. Freeman and Company, New York, USA

Advances in Fungal Biotechnology for Industry, Agriculture, and Medicine
Edited by Tkacz, Jan S.; Lange, Lene
Springer 2004 Advances in Fungal Biotechnology for Industry, Agriculture, and Medicine
Edited by Tkacz, Jan S.; Lange, Lene
Springer 2004

Madigan and Martinko (2006): Brook biology of Microorganisms. 11th edition, Pearson, Prentice Hall.

Dubey and Mahishwari (2006): A Textbook of Microbiology. S. Chand & Company LTD

Recommended books

Molecular Genetics of Bacteria (Hardcover) by Larry Snyder, Wendy Champness 2002

Modern Microbial Genetics by Uldis N. Streips and Ronald E. Yasbin (Hardcover - Feb 7, 2002)

An Overview on Toxigenic Fungi and Mycotoxins in Europe Edited by Antonio Logrieco and Angelo Visconti Springer 2004

Fungal Genomics - Applied Mycology and Biotechnology volume 4 Edited by D K Aurora and G G Khachatourians Elsevier February 2004

Madigan, Martinko and Parker (2003): Biology of Microorganisms. 10th edition, Pearson, Prentice Hall.

Madigan, Martinko and Parker (2000): Biology of Microorganisms. 9th edition, Pearson, Prentice Hall.

Dubey and Mahishwari (2004): A Textbook of Microbiology. S.Chand & Company LTD Dubey and Mahishwari (2003): A Textbook of Microbiology. S.Chand & Company LTD

Web sites

http://www.accessexcellence.org/RC/genetics.htm

http://www.oxfordjournals.org

http://www.cedarville.edu/academics/sciencemath/silvius/3520/352sites.html

www.safarix.com

www.researchnavigator.com

Facilities required for teaching and learning

- Well prepared laboratory, Lyopholizer, ELISA reader, PCR, Fluorescent Microscope,
- Selective culture media, chemicals and kits to examine all the tests required for the course
- Course web page, digital camera as tool for active learning
- Generic resources, such as the library.
- Electronic copies of past exam papers and example assessments.
- Computer Aided, such as E-mail, online conference, data show.
- Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

أ.د/ وجيه الشونى

Head of Department:

أ.د/ علاء مصطفى أبوزيد

Course Contents – Course ILOs Matrix

Course Contents	Weeks																			
		Knowledge and understanding				Intellectual						Practical					Tranferrable			
General bacteriology		A 1	A 2	A 3	A4	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	C 5	C 6	D 1	D 2	D 3	D 4
Microbial phylogeny derived from ribosomal RNA sequences	1	√	√									√							√	√
	Isolation of bacteria from different sources										√	√								
Microbial taxonomy and its relationship to phylogeny	2	√	√									√							√	√
	Biochemical identification of isolated bacteria											√		√	√					
Chemotaxonom	3	√	√									√							√	√

y (Genomic DNA:DNA hybridization, ribotyping, multilocus sequencing type, and lipid profiling)																				
	Molecular identification of bacteria											√	√	√	√					
The species concept in microbiology. Nomenclature and Bergey's Manual	4	√	√	√								√							√	√
	Isolation of bacteria from different clinical samples					√						√		√	√					
Isolation of pathogenic bacteria	5	√							√	√	√	√							√	√

from clinical specime ns (Growth media, blood cultures , urine cultures and fecal cultures)																				
Wounds and Abscess es. Genital specime ns and cultures of anaerob es	5	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Determi nation of antimic robial suscepti bility of antibiot ics against pathog enic bacteria									√		√	√	√	√					
Growth depende nt identific ation methods . Clinical	6	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

diagnosis																				
	Immunological and serological studies of pathogenic bacteria											√	√	√		√				
Midterm examination	7	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Antimicrobial drug susceptibility testing, Safety in Microbiology laboratory, Biological containment and laboratory biosafety levels	7	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Immunology and clinical diagnostic methods	8	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Immuno assays	8	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

for infectious diseases																				
Polyclonal and Monoclonal Antibodies, diagnostic and therapeutic uses	9	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
In Vitro Antigen-Antibody reactions, agglutination and uses in clinical and research laboratories	10	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fluorescent antibodies, Enzyme-linked immunosorbent assay and radioimunoassay, sensitivi	11	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

ty, and diagnostic and research laboratories applications																				
Immunoblot procedure and identification of specific proteins associated with specific pathogen	12	√	√	√	√	√	√								√	√	√	√	√	√
Recent Molecular diagnostic methods	13	√	√	√	√	√	√								√	√	√	√	√	√
Round up discussion on the topics of the course	14	√	√	√	√	√	√								√	√	√	√	√	√
Microbial phylogeny derived from ribosomal RNA sequenc																				

es																				
Applied Bacteriology		√									√	√	√	√	√	√	√	√	√	√
Microbiolgical control of plant pathogens	1	√									√	√					√	√	√	√
	Isolation of bacteria from different food sources											√	√	√		√				
Bacteria in food	2	√									√	√					√	√	√	√
	Isolation and enumeration of bacteria from water by filteration on membrane method										√	√		√						
Biomining (Bioleaching)	3	√									√	√					√	√	√	√
	Isolation of hyperaccumelat										√	√	v	√						

	or bacteria from polluted soil																			
Water treatment	4	√									√	√					√	√	√	√
	Extraction of lipase and protease enzyme from bacteria										√		√	√	√					
Sewage treatment	5	√	√	√	√						√	√					√	√	√	√
	Determination of antagonistic activity of bacteria against plant pathogenic microorganisms										√		√		√	√				
Biological washing powders	6	√	√	√	√						√	√	√	√	√	√	√	√	√	√

	Production of natural gasese from bacteria																			
Silage making and single-cell protein	7	√					√	√	√	√										√
Bioremediation	8	√	√	√	√	√	√	√	√	√	√									√
Biodegradation xenobiotics	9	√	√				√	√	√	√	√									√
Petroleum Biodegradation	10	√	√				√	√	√	√	√									√
Natural gases	11	√	√				√	√	√	√	√									√
Microbial plastics	12	√	√				√	√	√	√	√									√
Discussion	13																			
Assessment	14	√	√														√	√	√	√
Applied Mycology															√	√	√	√	√	√
Cultivation of edible mushro	1	√	√	√	√	√														√

om: preparation of substrate, spawn and methods of spawning																				
	Pretreatment of substrate for FSSF										√	√	√	√						
Conditions of solid state fermentation.	2	√	√	√	√	√														√
	Effect of water content on fungal growth during FSSF									√	√	√		√						
Biodegradation of colored effluents: enzymes responsible for effluents degradation	3	√	√	√	√	√														√

	PH requirement of fungal growth during FSSF									√	√	√	√	√						
culture condition and microorganisms for effluents degradation	4	√	√	√	√	√														√
	Temperature variation and control during FSSF								√	√	√	√	√	√						
Upgrading of lignocellulosic residue as feed: nutritive value of agricultural waste	5	√												√	√	√	√	√	√	√
	Different substrate								√	√	√	√								
Digestibility of straw and	6	√												√	√	√	√	√	√	√

treatment of straw with white-rot fungi.																				
	Factors involved in the selection of a suitable substrate for the desireds fungi to grow									√	√	√		√						
Assignment	7	√			√	√	√	√	√	√	√								√	√
	Cultivation of edible mushroom								√	√		√		√						
Water microbial pollution	8	√			√	√	√	√	√	√	√								√	√
	Effect of water content on fungal growth during FSSF							√			√		√	√						

Water Microbiology: pathogenic microorganisms transmitted by water,	9	√	√							√	√								√	√
	FACTORS AFFECTING SPAWN PREPARATION							√	√		√		√							
Ensuring the safety of drinking water,	10	√	√							√	√								√	√
	Estimation of digestibility of fermented lingo cellulosisis compound								√		√		√							
water pollution	11	√	√							√	√								√	√
	Decolorization of colored effluent								√		√		√							

	s																			
water purification	12																			
	Antimicrobial activity of some fungal pigment									√	√		√							
Sewage-treatment.	13																			
	Production of amylase enzyme																			
Assessment	14	√	√	√							√	√	√	√						
	Production of protease enzyme										√	√		√						
Materials and Methods		√	√	√							√	√	√	√						
Mutation, mutant detection, mutant selection and carcinogenicity	1	√	√	√							√	√	√	√						

testing.																				
Southern blotting technique,	2	√	√	√										√						
polymerase chain reaction	3	√	√	√										√						
Gene isolation and cloning	4	√											√	√	√	√	√	√	√	√
Gene Probes	5	√											√	√	√	√			√	√
Cloning vectors	6	√											√	√	√	√			√	√
Protein Blotting	7	√											√	√	√	√			√	√
Northern blotting	8	√	√	√	√	√	√							√	√	√			√	√
Western blotting	9	√	√	√	√	√	√							√	√	√				√
Gene expression	10	√	√	√	√	√	√							√	√	√				√
Expression vectors	11	√												√	√	√				√
Assignment	12	√											√	√	√	√				√
Application of genetic engineer	13	√											√	√	√	√				√

ing																				
Antimicrobial drugs assessment	14	√											√	√	√	√				√
Antibacterial compounds	15	√											√	√	√	√				√
Antifungal compounds	16	√											√	√	√	√	√	√	√	√
Leather Tanning By Microorganisms																				
Microbial proteases	1	√						√	√	√	√									√
Microbial collagenases	2	√						√	√	√	√									√
Microbial gelatinases	3	√						√	√	√	√									√
Microbial Lipases	5	√						√			√									√
Leathers nature	6	√	√	√	√	√	√	√			√									√
Leather tanning process	7	√									√	√	√	√	√					

Processing of leather during tanning preparation	8	√									√	√	√	√	√					
Protection the processed leather against microbial invaders	9	√									√	√	√	√	√					
Preservation of the processed leather against microbial invaders	10	√									√									
Assignment	11	√						√	√	√	√					√	√	√	√	√
Microbial problems associating with Leather processing during tanning process at industrial level	12	√						√	√	√	√					√	√	√	√	√

New approaches for leather processing during tanning process	13	√						√	√	√	√					√	√	√	√	√
Open discussion	14	√	√	√	√	√	√	√	√	√	√					√	√	√	√	√
Assessement	15																			

Teaching and learning methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Formal lecturing.	√	√	√	√	√	√	√					
Supplementary and library research.										√	√	√
Practical sections.								√	√			
external visits and student activities.										√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Assessment methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Written exam	√	√	√	√	√	√	√			√	√	√
Practical exam								√	√	√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Title: **Biostatistics**	Code: 1518
Coordinator	**Professor Kamal Shaltout**
Other Staff	**Prof. Dr/ M. Ezzat Abdel Monssef**
Course Delivery	**1st semester: 14 x 12h lectures** **14 x 2h practical** **2nd semester: 14 x 1 lectures**
Date of approval	**8/2014**

Academic Year : 2014-2015

Professional Information

Course aims:

Achieve a comprehensible form of the too much data that characterizes the modern biological research.Apply statistical tests for evaluating differences, variations and associations between populations and their significance in probability terms. Teach the students the modern software programs for statistical analysis and to interpret and make inferences from analysis of set of observations sampled from a population. Find out the best possible experimental design that provides the best sorting out of the controlled and uncontrolled variations.

Intended learning outcomes of course (ILOs)
a-Knowledge and understanding:

By the end of the M. Sc. course the graduate must be able to :-

A1. Identify the role of the biostatistics in the procedure of the biological scientific research.

A2. Recognize the association between variables in normal and non-normal distributed populations (correlations and regressions).

A3. Compare between each pair of treatments in multi-treatment experiments

A4. Explain the tests of significance of difference between two or more than two sampled populations.

A5. Discuss the application, advantages and disadvantages of the different types of experimental designs.

b- Intellectual skills

By the end of the M. Sc. course the graduate must be able to :-   B16. Differentiate between the characteristics of the different types of distributions   B17. Demonstrate the principles and approaches underlying current methods of biostatistics and its application using computer software programs   B18. Apply the best suitable statistical tests for the different biological experiments   B19. Design suitable experimental   B20. Analyze the results statistically

c- Professional and practical skills

By the end of the Diploma course the graduate must be able to :-   C28. Perform the best suitable statistical tests for the different biological experiments   C29. Provide the statistical consultation for the students and researchers of biology.   C30. Prepare the suitable experimental design and how to analyze the results statistically

d- General and transferable skills

By the end of the Diploma course the graduate must be able to :-   D17. Use databases and library search methods as well as internet sites   D18. Independent learning ability required for continuing professional development   D19. Work with others, use and manage ideas and information .   D20. Demonstrate written and verbal communication skills on modern approaches

Contents

Week	Topic (1 hour / week)
1	Introduction about Biostatistics as a tool of scientific research
2	Sampling of attributes
3	Frequency and probability distributions
4	Normal distribution
5	Binomial distribution
6	Frequency and probability distributions

7	Normal distribution and Binomial distribution
8	Poisson distribution
9	Tests of significance
10	Round-up discussion on the previous topics
11	Partial examination
12	Introductory note on analysis of variance
13	Data transformations, One-way analysis of variance
14	Some basic experimental designs (completely random, randomized complete block and Latin square designs)
15	Two-way analysis of variance
16	Split-plot experimental design Split-plot experimental design
17	Least significant difference (LSD)
28	Least significant range (LSR) tests
29	Simple linear regression
20	Simple linear regression
21	Rank correlation
22	Curve fitting
23	method of least squares
24	Multiple correlation, regression and analysis of time series
25	Multiple regression
26	Analysis of time series
27	Round up discussion on the previous topics
28	Round up discussion on the previous topics

4. Teaching, and learning methods:

4.1.Formal lecturing including visual PowerPoint; blackboard, and chalk presentation.

4.2. Supplementary information from internet, and library research.

4.3. Practical sections with good handling practice, and open discussions.

4.4. Independent learning tasks, external visits, and student activities.

5. Student assessment:

Assessment Method	Skills assessed*	Assessment Length	Schedule	Percentage	Degree
Written exam	K, I, T	2 h.	16th week	60	60
Practical exam	P, T	2 h.	15th week	40	40
Total				100	100

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

List of references

Course notes

Essential books (text books)

Zar, J. H. 1984. Biostatistical Analysis: Second Edition. Prentice Hall, Inc., New Jersy, USA

Snedecor, G. W. & Cochran, W. G. 1967. Satistical Methods. The Iowa State University Press, Iowa, USA.

Zar, J. H. 1984. Biostatistical Analysis: Second Edition. Prentice Hall, Inc., New Jersy, USA

Snedecor, G. W. & Cochran, W. G. 1967. Satistical Methods. The Iowa State University Press, Iowa, USA.

Recommended books

Voelkl, K. E. & Gerber, S. B. 1999. ***Using SPSS for Windows: Data Analysis and Graphics.*** Springer, New York, USA.

Stephens, L. J. 1998. ***Beginning Statistics***. Schaum's Outline Series, McGraw-Hill. New York, USA.

Web sites

www.google.com

http://www.accessexcellence.org/RC/genetics.htm

www.researchnavigator.com

8. Facilities required for teaching and learning

- Generic resources, such as the library.

- Electronic copies of past exam papers and example assessments.

- Computer Aided, such as E-mail, online conference, data show. - Course web page, Digital camera for images collections as a tool for active learning

Course coordinator:

أ.د/ كمال حسين شلتوت

Head of Department:

أ.د/ علاء مصطفى أبوزيد

Date: 8/2014

Tanta University, Faculty of Science

Course Contents – Course ILOs Matrix

Course code:1518, course title: Biostatistics and Biochemistry

Course Contents	Weeks	Knowledge and understanding				Intellectual						Practical					Tranferrable			
		A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	B 5	C 1	C 2	C 3	C 4	C 5	C 6	D 1	D 2	D 3	D 4
Introduction about Biostatistics as a tool of scientific research	1	√										√	√	√	√				√	√
Sampling of attributes	2	√										√	√	√	√				√	√
Frequency and probability distributions	3	√										√			√				√	√
Normal distribution	4	√										√			√				√	√
Binomial distribution	5	√	√	√																√
Frequency and probability	5	√	√	√																√

distributions																				
Normal distribution and Binomial distribution	6	√										√	√	√	√	√	√	√	√	
Poisson distribution	7	√										√					√	√	√	
Tests of significance	7	√										√					√	√	√	
Round-up discussion on the previous topics	8	√										√	√						√	
Partial examination	8	√	√	√							√									
Introductory note on analysis of variance	9								√	√	√									
Data transformations, One-way analysis of variance	10	√	√	√							√									
Some basic experimental	11	√	√	√							√	√					√	√	√	

designs (completely random, randomized complete block and Latin square designs)																				
Two-way analysis of variance	12	√				√	√	√	√	√	√							√	√	√
Split-plot experimental design Split-plot experimental design	13	√				√	√	√	√	√	√							√	√	√
Least significant difference (LSD)	14	√				√	√	√	√	√	√							√	√	√
Least significant range (LSR) tests	15																			
Simple linear regression	16	√	√	√	√	√											√	√	√	√
Simple linear regression	17	√	√	√																

Teaching and learning methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Formal lecturing.	√	√	√	√	√	√	√					
Supplementary and library research.										√	√	√
Practical sections.								√	√			
external visits and student activities.										√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

Assessment methods / ILOs matrix:

Course contents	K				I			P		T		
	A1	A2	A3	A4	B1	B2	B3	C1	C2	D1	D2	D3
Written exam	√	√	√	√	√	√	√			√	√	√
Practical exam								√	√	√	√	√

* K= Knowledge, and understanding skills; I= Intellectual skills; P= Professional, and practical skills; T= General, and transferable skills.

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