جامعة أم القرى

كلية العلوم التطبيقية

الدكتوراه في علم الحيوان

4. Learning and Teaching

4/1 Learning Outcomes and Graduate Specifications

4/1/2 Curriculum Study Plan Table

Year	Course Code	Course Title	Required or Elective	* Pre-Requisite Courses	Credit Hours	College or Department
1st Year (Semester 1) 2 Compulsory courses (8 credit hours) Semester total = 8 credit hours	4013711-4	Advanced Cytology	R	N/A	4	
	4013712-4	Advanced Molecular Biology	R	N/A	4	
1 Subject-Specific Elective Course (4 credit hours) Semester total = 4 credit hours	4013770-4	Emerging Topics in cell biology	E	N/A	4	
	4013771-4	Emerging Topics in Animal Histology	E	N/A	4	
	4013772-4	Emerging Topics in Animal Physiology	E	N/A	4	
	4013773-4	Emerging Topics in Entomology	E	N/A	4	
	4013774-4	Emerging Topics in Biotechnology	E	N/A	4	
	4013775-4	Emerging Topics in Stem Cell Biology	E	N/A	4	
	4013776-4	Emerging Topics in Parasitology	E	N/A	4	
	4013777-4	Emerging Topics in Endocrinology	E	N/A	4	
	4013778-4	Emerging Topics in Animal Ecology	E	N/A	4	
	4013779-4	Emerging Topics in Genetics	E	N/A	4	
	4013780-4	Emerging Topics in Immunology	E	N/A	4	
	4013781-4	Emerging Topics in Invertebrate Zoology	E	N/A	4	
	4013782-4	Emerging Topics in Vertebrate Zoology	E	N/A	4	
	4013783-4	Emerging Topics in Embryology	E	N/A	4	
2nd and 3rd Year (first and second semesters)	4013799-10 / Research Project leading to PhD thesis / Dissertation					

4/1/4. Course Specification:

Required course: Advanced Cytology 4013711-4

COURSE SPECIFICATIONS

Form

Course Title: Advanced Cytology

Course Code: 4013711-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University**
Date:

College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Advanced Cytology (4013711-4)**
2. Credit hours:
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course
The main goal of the course is to introduce an advance understanding of
2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The present course study major topics in cytology and skills needed in the field of cell biology as classification and properties of cells and cell activities. The role of cells in research and biotechnology. Growth and regulation of the animal cell, Disorders and imbalances of cell growth, cell cycle, growth factors and receptors, structure of cell chromatin and chromosomes, DNA replication and repair, checkpoints of the cell cycle. Cell division, programmed death, cell signals. Proteomics, protein reactions, micro-particles. Basis of oncology, nature of tumor, tumor of viruses, invasion and metastasis, inhibitors of tumor. Study modern techniques in cytology such as mass methods of measuring cell growth, spectrometry, microarray, microplates and other published methods related to research plans.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction about modern topics selected according to research plan of PhD students such as: cell biology, the role of cells in research and biotechnology		
Structure and function of cellular membranes and cytoplasmic organelles.		
Membrane functions and permeability properties, cell transport, endocytosis, phagocytosis and pinocytosis		
Cell cycle, growth factors disorders and imbalances of cell growth and receptors, programing cell death.		
Chromatin, chromosomes, DNA-replication, and repair.		
Cellular signals, cytogenetics and other.		
Proteomics, protein reactions, micro-particles		
Oncology, cancer cells nature of tumors, invasions and metastasis.		
Study recent techniques needed for the cell research such as applications of DNA chip analysis "microarray", standard blotting membranes or microplates.		
Apply common experiments to array research samples for matching of known and unknown DNA samples that based on base pairing rules.		
total	15	64

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					4

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- Understand the modern topics in cytology including biology of the cell, cell cycle, factors of cell growth, cell signals and cytogenetics.
- Illustrate the role of cells in research and biotechnology.
- Learn the structure and function of plasma membranes.
- Understand the growth and regulation of the animal cell
- Identify the factors affecting cell growth and activity
- Differentiate disorders and imbalances of cell growth
- Understand structure and chromosomal aberration, DNA-replication and repair
- Study proteomics, protein reactions, micro-particles.
- Learn basis of oncology, nature of tumors, invasions and metastasis.
- Demonstrate cancer cells
- Apply recent skills in the field cytology.
- To apply recent techniques such as microarray, and microplates.
- Write information clearly in weekly reports
- Visit libraries and make notes of the upcoming lectures.
- Work effectively as an individual or part of a team
- Use scientific resources to collect the information.
- Be able to analyses data and compare it with other studies.
- Demonstrate effective communication skills in the form of student led group presentations.
- Demonstrate skills in working effectively with others as a member of a team.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies

that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1			
1.2			
2.0	**Cognitive Skills**		
2.1			
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1			
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1			
4.2			
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Paper presentation (seminar)		30%
2	Short essay		20%
3	Short written exam		10%
4	Long literature review		40%
5	TOTAL		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:
Cytology and cell biology textbooks
Cell proteins, proteome text books
Genetics, molecular biology and cancer biology textbooks

1- Verma P.S. and Agarwal V.K. (1999) Textbook of Cytology, S.Chand & Company LTD.
2- Edmund S. Cibas, MD and Barbara S. Ducatman, MD , Cytology, 4th Edition, Copyright © 2014 Elsevier Canada

3- Jump up , "Cytology". Collection development manual of the National Library of Medicine (4th ed.). Bethesda, MD: National Library of Medicine, National Institutes of Health, U.S. Department of Health and Human Services. 2004.
4- Christine, Zuchora-Walske (2015). Key Discoveries in Life Science. minneapolis: Lerner Publications. p. 9. ISBN 9781467762502.

2. List Essential References Materials (Journals, Reports, etc.)

High Impact Journals:

1- Journal of Cytology
2- Journal of Cell Biology
3- Biomednit.com
4- Journal of biological sciences
5- CytoJournal
6- Journal of Cytology and Histology
7- Journals related to cancer, cell and molecular biology

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.
(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

(1)- Questionnaires / students opinion survey
(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

1)- Revision of student answer papers / assignments by another staff member.
(2)- Analysis the grades of students.

3. Procedures for Teaching Development

(1)- Preparing the course as PPT.
(2)- Using scientific youtubes.
(3)- Coupling the theoretical part with laboratory part
(4)- Periodical revision of course content.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ **Date Completed:** _____

Program Coordinator: _____

Signature: _____ **Date Received:** _____

Required course: Advanced Molecular Biology 4013712-4

COURSE SPECIFICATIONS

Form

Course Title: Advanced Molecular Biology

Course Code: 4013712-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University**
Date:

College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Advanced Molecular Biology (4013712-4)**
2. Credit hours: **4 Credit hours**
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

The main emerging goals of the course is to introduce an advance understanding of

- **Genomics, functional structure and applications of biological molecules in various fields and utilization, industrial, environmental.**
- **Study genome structure, the physical and chemical properties of the information containing biopolymers; nucleic acid and protein, and the flow of genetic information from DNA to RNA to Protein.**
- **Understand the basic principles of molecular genetics are also introduced and some of the current techniques used in molecular biology research are presented.**
- **Learn the DNA replication, recombination, and repair; mutagenesis.**
- **To be familiar with building and visualization of genetic libraries, genetic maps gene detection; mobile genetic elements.**
- **Study enzymes and proteins related to genome and regulation of gene expression.**
- **Analyze of sequences and expression.**
- **Apply methods of protein determination.**
- **Align the sequences by dynamic programming. Models and units of protein, protein dynamics, determination of the size of protein molecules and surface area.**
- **Multiple alignment and compatibility patterns. Stabilized and adhered to the structural structure of the protein**
- **Training on multiple alignment and compatibility patterns. Stabilized and adhered to the structural structure of the protein**
- **The laboratory introduces experimental methodologies, molecular biological techniques, genome purification techniques, cell culture techniques, transformation, DNA and protein isolation, electrophoresis, Southern and Western blotting, DNA sequencing, and recombinant DNA techniques.**

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The present course study major topics in molecular biology, in addition to specific for PhD plan. Lecture topics include genomics, functional structure and applications of biological molecules in various fields and utilization, industrial, environmental. It covers the physical and chemical properties of the information containing biopolymers; nucleic acid and protein, and the flow of genetic information from DNA to RNA to Protein. The basic principles of molecular genetics are also introduced and some of the current techniques used in molecular biology research are presented.
The structure and function of nucleic acids and proteins; DNA replication, recombination, and repair; mutagenesis. Study of genome structure. Building and visualization of genetic libraries, genetic maps gene detection; mobile genetic elements. Enzymes and proteins related to genome. Transcription and translation, regulation of gene expression. Analysis of sequences and expression.
Methods of protein determination. Align the sequences by dynamic programming. Models and units of protein, protein dynamics, determination of the size of protein molecules and surface area. Multiple alignment and compatibility patterns. Stabilized and adhered to the structural structure of the protein
The laboratory introduces experimental methodologies, molecular biological techniques, genome purification techniques, cell culture techniques, transformation, DNA and protein isolation, electrophoresis, Southern and Western blotting, DNA sequencing, and recombinant DNA techniques.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Introduction to modern topics in molecular biology.		
genomics, functional structure and applications of biological molecules in various fields and utilization, industrial, environmental.		
The physical and chemical properties of the information containing biopolymers; nucleic acid and protein, and the flow of genetic information from DNA to RNA to Protein.		
DNA replication, recombination, repair and mutagenesis.		
Molecular genetics are also introduced and some of the current techniques used in molecular biology research are presented.		
Genetic libraries, genetic maps gene detection.		
Enzymes and proteins related to genome.		
Transcription and translation, regulation of gene expression. Sequencing and expression.		
Align the sequences by dynamic programming		
Models and units of protein, protein dynamics, determination of the size of protein molecules and surface area		
Multiple alignment and compatibility patterns		
Stabilized and adhered to the structural structure of the protein		
Concepts and relationships of databases		
Tree-tree relationships between organisms, and comparisons to determine degrees of convergence		
Practical application includes molecular biological techniques, genome purification techniques,		
Cell culture techniques, transformation, DNA and protein isolation,		
Electrophoresis, Southern and Western blotting, DNA sequencing,		
Recombinant DNA techniques.		
Total	14	64

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					4

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- **Study systems of classification and cloning**
- **Learning the genetic maps**
- **To know the physical and chemical properties of the information containing biopolymers; nucleic acid and protein, and the flow of genetic information from DNA to RNA to Protein.**
- **Understand the basic principles of molecular genetics are also introduced and some of the current techniques used in molecular biology research are presented.**
- **Understand building and visualization of genetic libraries**
- **Analysis of sequences and expression**
- **Identify Knock Out Gene and Transcription patterns**
- **Demonstrate of genome structure.**
- **Learn of various genome purification techniques.**
- **Study of enzymes and proteins related to genome.**
- **Stabilized and adhered to the structure of the protein**
- **Study tree-tree relationships between organisms and comparisons to determine degrees of convergence**
- **Methods of gene detection**
- **Methodology determination of proteins, size of protein molecules and surface area**
- **Apply multiple alignment and compatibility patterns.**
- **Methods of protein determination. Align the sequences by dynamic programming. Models and units of protein, protein dynamics, determination of the size of protein molecules and surface area. Multiple alignment and compatibility patterns. Stabilized and adhered to the structural structure of the protein**
- **Write information clearly in weekly reports**
- **Visit libraries and make notes of the upcoming lectures.**
- **Work effectively as an individual or part of a team**
- **Use scientific resources to collect the information.**
- **Be able to analyses data and compare it with other studies.**
- **Demonstrate effective communication skills in the form of student led group presentations.**
- **Demonstrate skills in working effectively with others as a member of a team.**

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1			
1.2			
2.0	**Cognitive Skills**		
2.1			
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1			

3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1			
4.2			
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	**Paper presentation (seminar)**		**30%**
2	**Short essay**		**20%**
3	**Short written exam**		**10%**
4	**Long literature review**		**40%**
5	**TOTAL**		**100%**

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:
R M Twyman, Peter and Irene and to my children, Emily and Lucy Richard. Advanced Molecular Biology,
Textbook of proteins
extbook of dynamics of molecules

2. List Essential References Materials (Journals, Reports, etc.)

- **Sites related to the emerging topics**
- **Journal related to molecular biology**

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

- **http://molbiol.ru/forums/uploads/lit/Advanced_Molecular_Biology_A_Concise_Reference.pdf**
- **https://febs.onlinelibrary.wiley.com/doi/pdf/10.1016/0014-5793%2885%2980897-8**
- **http://johnjay.jjay.cuny.edu/files/FOS_732_Advanced_Molecular_Biology_I.pdf**
- **http://www.faculty.virginia.edu/evolutionlabs/ClendeningBiosceneDrosophilav28-1p3-19.pdf**
- **https://sydney.edu.au/science/molecular_bioscience/units_of_study/course_outlines/syllabusMBLG1001_10.pdf**
- **Sites related to the emerging topics**
- **Journal related to molecular biology**

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.

(2)- A computer lab is required and connected to the network for students to gather their data and study materials
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **(1)- Questionnaires / students opinion survey** **(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting**
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department **1)- Revision of student answer papers / assignments by another staff member.** **(2)- Analysis the grades of students.**
3. Procedures for Teaching Development **(1)- Preparing the course as PPT.** **(2)- Using scientific youtubes.** **(3)- Coupling the theoretical part with laboratory part** **(4)- Periodical revision of course content.**
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: _____

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Cell Biology

Course Code: 4013770-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University**
Date:

College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Cell Biology (4013770-4)**
2. Credit hours:
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course
The main goal of the course is to study an advance understanding of modern topics in cell biology and cytogenetics. Structure and function of cell membrane. Structure and function of chromatin, DNA replication and repair, RNA transcription, nucleoproteins. To understand cell cycle regulation, cell growth, synchronization and cell division. To learn cell regulation in primary organisms and in multicellular organisms and identification of cellular signal types. To understand cellular receptors and their pathways and their role and importance in growth and cancer. To apply cell immunity and nanotechnology and other modern techniques in the biology of cell.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:
This course is designed for graduate students who have successfully completed an undergraduate course in cell biology. It introduces an advance understanding of modern topics in cell biology and cytogenetics, which is fundamental to all of the biological sciences and necessary for molecular bioengineering research. Topics include the principles of cellular organization and function, regulation of the cell cycle, interactions between cells, and biochemical activities such as biosynthesis, catalysis and energy

production by mitochondria and chloroplasts, in addition, membrane structure and function; intracellular compartments such as cytoskeleton; cell junctions. Other topics can be studies according to student needs such as protein structure and function; DNA and chromosomes; DNA replication, repair, and recombination; control of gene expression, cell division and cell death; cell regulation in primary organisms and in multicellular organisms; identification of cellular signal types; cellular receptors and their pathways with their role and importance in the organism in growth and cancer. Cell immunity and nanotechnology. Apply modern techniques in the biology of cell.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Introduction to advanced topics in cell biology.		
Membrane structure, membrane transport, and transport		
Intracellular compartments and cytoskeleton		
Biosynthesis, catalysis and energy production by mitochondria and chloroplasts		
Structure and function of chromatin, DNA replication, repair and recombination		
Genome transcription		
Cell receptors, their pathways and its role in growth and cancer.		
Control of gene expression		
Protein structure and function		
Cell immunity and nanotechnology and other		
Cell growth, synchronization, cell division and cell death		
Cell-cycle regulation in unicellular or multicellular organisms.		
Modern techniques in the cell biology.		
Cell communication and identification of cellular signal		
Total	**14**	**64**

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- Understand the cell regulation in primary organisms and in multicellular organisms
- Identify cellular signal types, cellular receptors and their pathways and their role and importance in growth and cancer.
- Apply modern techniques in the biology of cell nanotechnology
- Study biosynthesis, energy production, cell communication.
- DNA replication, repair, and recombination.
- Control of gene expression
- From DNA to protein: How cells read the genome
- Understand Protein structure and function.
- Membrane structure and functions
- Cell communication and cytoskeleton
- Cell division and cell death
- Write information clearly in weekly reports
- Visit libraries and make notes of the upcoming lectures.
- Work effectively as an individual or part of a team
- Use scientific resources to collect the information.
- Be able to analyses data and compare it with other studies.
- Demonstrate effective communication skills in the form of student led group presentations.

- **Demonstrate skills in working effectively with others as a member of a team.**

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

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2.0	**Cognitive Skills**		
2.1			
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1			
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1			
4.2			
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Paper presentation (seminar)		30%
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4	Long literature review		40%
5	TOTAL		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:

- **Adnan Aftab, Essentials cell biology 4th ed.**
- **Molecular biology**

2. List Essential References Materials (Journals, Reports, etc.)

- **http://herba.msu.ru/shipunov/school/biol_250/index.htm**
- **http://herba.msu.ru/shipunov/school/biol_250/lec_250_01.pdf**
- **http://biology.usf.edu/ykF13ac.pdf**
- **http://www.ntu.edu.sg/home/slim/documents/bg7004_syllabus_ay0910_s2.pdf**
- **https://www4.uwm.edu/schedule/syllabi/213943715.pdf**
- **https://web-app.usc.edu/ws/soc_archive/soc/syllabus/20133/40654.pdf**
- **Sites related to the selected topic**
- **Impacted journal related to the selected topic**

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

(1)- Sites related to the selected topic
(2)- Impacted journal related to the selected topic

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.
(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

(1)- Questionnaires / students opinion survey
(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

1)- Revision of student answer papers / assignments by another staff member.
(2)- Analysis the grades of students.

3. Procedures for Teaching Development

(1)- Preparing the course as PPT.
(2)- Using scientific youtubes.
(3)- Coupling the theoretical part with laboratory part
(4)- Periodical revision of course content.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____ **Date Received:** _____

Elective course: Emerging topics in Animal histology 4013771-4

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Animal Histology

Course Code: 4013771–4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University** Date:
College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Animal Histology (4013771-4)**
2. Credit hours:
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

Histology is the study of the cellular architecture of tissues and provides deep insights into the workings of body organs that carry out the complex functions of life. Consequently, this course introduces numerous emerging topics of animal histology that necessary for different research plans. The main topics include detailed study on the microscopic and ultramicroscopic structure of animal tissues of selected organs of either invertebrate or vertebrate animals to understand significance and functional correlations of micro-anatomical structures and explore the relationship between structure and function of selected organs.

In the lectures, the normal microscopic anatomy and submicroscopic structure of cells and tissues are described.

In this course, we will take a comparative approach to the subject by studying tissue structure in a variety of animal species, including humans, with an eye toward identifying the functional consequences of similarities and differences.

This course introduces numerous emerging topics of animal histology that necessary for different research plans. The main topics include detailed study on the microscopic and ultramicroscopic structure of animal tissues of selected organs of either invertebrate or vertebrate animals to understand significance and functional correlations of microanatomical structures and explore the relationship between structure and function of selected organs that carry out the complex functions of life. In the lectures, the normal microscopic anatomy and submicroscopic structure of cells and tissues are described.

Histology is the study of the cellular architecture of tissues and provides deep insights into the workings of body organs that carry out the complex functions of life..

Practical goals: This is an upper level course designed for students who want intensive preparation in microanatomy. Methods used in fixation, embedding, sectioning and staining of some invertebrate and vertebrate organs. Microscopic examination and identification of sections, smears and squashes of the organs of animals, Histochemical studies of tissues. In Laboratory sessions (2hour/week), you will examine and analyze the materials being studied using both light and electron microscopy micrographs. Students should be able to differentiate the various histological structures from each other.

This course provides an introduction to the microscopic anatomy of animals. The animal body is composed of a vast diversity of cell types, which are in turn organized into tissues and organs that carry out the complex functions of life. Histology is the study of the cellular architecture of tissues and provides deep insights into the workings of the body. In this course, we will take a comparative approach to the subject by studying tissue structure in a variety of animal species, including humans, with an eye toward identifying the functional consequences of similarities and differences. The course will begin with the classification of tissue types and progress through the structure of organs. While the emphasis will be on normal (healthy) anatomy, some pathology will be introduced to illustrate the macroscopic consequences of microscopic abnormalities. By the end of the course, students will be able to examine images of a tissue section and identify the types of tissues present, their roles, and the relationship between structure and function. This course is ideal for students considering careers in veterinary or human medicine and for students with a particular interest in animal biology. Prior completion of a high school biology course is recommended but not required.

Aims: The knowledge that you will derive from this course will extend what you learn in Gross Anatomy.

In addition, your study of cells, tissues and organs will correlate with information on their function that you receive in this and other courses.
This course will also provide basic knowledge concerning the structure and function of normal cells, tissues and organs, which is a prerequisite for the study of their pathology.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The course will begin with the classification of tissue types and progress through the structure of organs and differences between macroscopic consequences of microscopic abnormalities. It provides an introduction to cellular architecture of tissues and the microscopic anatomy of animal tissues and organs that carry out the complex functions of life. The student will take a comparative approach for histological and histochemical samples by examine and analyze the obtained results using both light and electron microscopy micrographs. The lab portions of the course are completely integrated according to the lecture topics that will be covered during each session. Student will be applying intensive preparation for normal and histochemical samples either for light and electron microscopy including fixation, embedding, sectioning and staining techniques. Lab study materials will include CD, World Wide Web, DVDs, digital images and available microscope slides.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Introduction to cellular architecture of tissues and the microscopic anatomy of animal tissues and organs including epithelial, connective, muscular and nervous tissues.		
Study classification of tissue types and progress through the structure of organs and differences between macroscopic consequences of microscopic abnormalities in selected body organs that represent different systems		
Comparative studies for cytoarchitecture, histological and histochemical tissue samples by using light and electron microscopy micrographs.		

The lab portions will be applying intensive preparation for normal and histochemical samples either for light and electron microscopy including fixation, embedding, sectioning and staining techniques. Lab study materials will include CD, World Wide Web, DVDs, digital images and available microscope slides.		
Total	**14**	**64**

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- **To use the specific and precise terminology of the field of histology**
- **To acquire a working knowledge and understanding of the microscopic anatomy and ultrastructure of cells and tissues either in invertebrate or vertebrates animals.**
- **To acquire a working knowledge and understanding of the relationship between the structure and function of differentiated/specialized cell types, tissue types, and organs.**
- **To observe and study the microscopic anatomy of selected differentiated/specialized cell types, tissue types.**
- **To gain a working knowledge and understanding of some of the preparation and staining techniques used to investigate microanatomy.**
- **Understand and identify the normal structure and function of each of four principle tissues.**
- **Understanding the interaction between the four types of the tissues.**
- **To illustrate the macroscopic consequences of microscopic abnormalities.**
- **To differentiate the various histological structures from each other.**
- **Demonstrate the structure of body system and its organs.**
- **Write information clearly in weekly reports**
- **Visit libraries and make notes of the upcoming lectures.**
- **Work effectively as an individual or part of a team**
- **Use scientific resources to collect the information.**
- **Be able to analyses data and compare it with other studies.**
- **Demonstrate effective communication skills in the form of student led group presentations.**
- **Demonstrate skills in working effectively with others as a member of a team.**

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1			
1.2			

2.0	**Cognitive Skills**		
2.1			
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1			
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1			
4.2			
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	**Paper presentation (seminar)**		**30%**
2	**Short essay**		**20%**
3	**Short written exam**		**10%**
4	**Long literature review**		**40%**
5	**TOTAL**		**100%**

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:

- **Neelam Vasudeva, Sabita Mishra(2016): Inderbir Singh's Textbook of Human Histology: With Color Atlas and Practical Guide.8th edi. Jaypee.**
- **Luiz Carlos Junqueira and Jose Carneiro(2010): Basic Histology: Text & Atlas: Text and Atlas (Junqueira's Basic Histology) McGraw-Hill Medical; 11 edition.**
- **Luiz Carlos Uchôa Junqueira (2014): Histologia Básica. Texto e Atlas (Em Portuguese do Brasil) (Portuguese Brazilian).**
- **Luiz Carlos Uchôa Junqueira (2012): Biologia Celular e Molecular (Em Portuguese do Brasil) (Portuguese Brazilian).**

2. List Essential References Materials (Journals, Reports, etc.)

(1)- journals related to emerging topics
Such as:

- **Journal** of Histology & Histopathology.
- **Egyption Journal of Histology(Egypt).**
- **Journal of Cytology & Histology (USA).**

(2)- Sites related to emerging topics

https://www.researchgate.net/publication/281651977_Histology_Study_of_Human_Tissue
http://www.people.vcu.edu/~cconway/histology/Histology%20Syllabus-F2003.pdf
https://www.sas.upenn.edu/summer/sites/neutron_sas.summer/files/Histology-Module-Syllabus.pdf
http://medicine.ju.edu.jo/Lists/Courses/Attachments/392/General%20Histology.pdf
http://facstaff.cbu.edu/aross/Histology/Histol-Syllabus-2015.pdf
https://www.cpp.edu/~seskandari/documents/ZOO428_Syllabus_Winter_2016.pdf

http://www.eksu.edu.ng/wp-content/uploads/2010/06/ZOOLOGY%20COURSE%20CONTENT%20SPECIFICATIONS.pdf

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

Lecture and lab study materials will include CD, World Wide Web, DVDs, digital images and available microscope slides.

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

Laboratory sessions will include some presentations by the professor as well as independent and group work using the study materials. Successful students will learn how to locate and identify normal mammalian tissues and organs using photomicrographs, microscope slides, digital images, CD, and WWW resources.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.
(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

(1)- Questionnaires / students opinion survey
(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

1)- Revision of student answer papers / assignments by another staff member.
(2)- Analysis the grades of students.

3. Procedures for Teaching Development

(1)- Preparing the course as PPT.
(2)- Using scientific youtubes.
(3)- Coupling the theoretical part with laboratory part
(4)- Periodical revision of course content.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ **Date Completed:** _____

Program Coordinator: _____

Signature: _____ **Date Received:** _____

Elective course: Emerging topics in Animal physiology 4013772-4

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Animal Physiology

Course Code: 4013772-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University**
Date:

College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Advanced Emerging Topics in Animal Physiology (4013772-4)**
2. Credit hours:
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

The main goal of the course is to introduce selected topics according to the student PhD plan. It include: Introduction to advanced physiological systems; cytophysiology; muscle and neurophysiology; cardiophysiology; nutrition and nutrition and gastrointestinal physiology; breathing and pulmonary physiology; renal physiology; endocrinology; bioluminescence; immunology; reproductive physiology.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course will focus on some emerging topics according the student PhD plan:
These topics include:

- **Introduction to the physiological systems are specialized to meet many of the environmental challenges encountered by terrestrial and aquatic environments.**
- **Cellular Physiology, Muscle and Neuron Physiology, Neurophysiology, Sensory system, Cardiophysiology, Breathing and Pulmonary physiology,**
- **Vertebrate physiology.**
- **Nutrition and Gastrointestinal physiology,**

- **Renal physiology, Excretion by ammonotelic, uricotelic and ureotelic animals. Regulation of salt and water in animals inhabiting marine, fresh-water, brackfish, estuarine and terrestrial environments. Excretion by ammonotelic, uricotelic and ureotelic animals.**
- **Movements,**
- **Minerals Bones and Joints,**
- **Endocrinology, Hibernation, Regulation of salt and water in animals inhabiting marine, fresh-water, brackfish, estuarine and terrestrial environments.**
- **Bioluminescence, Chromophores and Colour change in animals.**
- **Thermal Physiology and energy balance,**
- **Immunology,**
- **Reproductive physiology, Hormonal regulation of reproductive cycles. Courtship behaviour, Sexual behaviour.**
- **Lactation, Student Presentations.**
- **Practically: Apply laboratory techniques and equipment used in the acquisition of physiological data.**

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Requirement topics:		
Cellular Physiology, cellular and molecular mechanisms, intracellular and extracellular communication systems, Structure of biological membranes. Function of biological membranes including the role of membrane proteins in catalysis, recognition, and transport, Movement of water and solutes between the fluid compartments. Metabolism and energy production.		
Emerging topics:		
Neurophysiology, (Nervous system, Sensory system): Organization structural and functional organization of the nervous system, including the central and peripheral nervous systems, the autonomic nervous system, and the enteric nervous system. The resting membrane potential. The action potential, action potential propagation along the axon. Chemical messenger molecules of the nervous system, including classical and non-classical neurotransmitters. Synaptic neurotransmission. Basic principles of sensory physiology. Vision physiology. Hearing physiology.		
Cardiophysiology (Cardiovascular system): Structure and functions of the cardiovascular system, including the mechanical and electrical properties of cardiac muscle function. Excitation-contraction coupling in cardiac muscle. Reflex regulation of blood pressure.		
Pulmonary physiology (Respiratory system): Structure and functions of the respiratory system, including lung volumes, gas exchange, and gas transport in blood. Regulation of ventilation.		
Gastrointestinal physiology (Digestive system, Digestive glands, Liver): Motility, secretion, digestion, absorption in the gastrointestinal system.		
Renal physiology: body fluids, homeostasis, fluid and pH Balance. Body fluid compartments and the ionic composition of body fluids. Structure and functions of the kidney nephrons, including glomerular filtration, tubular reabsorption, tubular secretion, and excretion. Transport of water, ions, and organic molecular across the tubular epithelia. Renal clearance. Urinary concentrating mechanisms. Acid-base balance.		
Endocrinology: Principles of hormone action, including structure, mechanism of release from endocrine cell, mode of transport in blood, mechanism of action in target cells, and systemic effects of important hormones. Functions of the endocrine system with focus on classic endocrine glands, including the hypothalamus and the pituitary glands, thyroid and parathyroid glands, adrenal glands, endocrine pancreas. The renin-angiotensin-system.		
Movements (skeletal muscles): Structure and function of skeletal muscle, including excitation-contraction coupling, sliding filament mechanism, force generation, and isometric versus isotonic contractions. Visceral muscles: Structure and functions of smooth muscle, including excitation-contraction coupling in smooth muscle.		

Minerals Bones and Joints (skeletal system)		
Thermal Physiology and energy balance		
Immunology		
Reproductive physiology, Hormonal regulation of reproductive cycles. Courtship behaviour, Sexual behavior and Lactation		
Total	30	64

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- Understand the cellular and molecular physiology
- Identify and differentiate
- Demonstrate muscular-nervous coordination; neurophysiology and sensory system
- Learn cardiophysiology and pulmonary physiology
- Illustrate the renal physiology
- Identify gastrointestinal physiology
- Understand endocrinology, hormonal regulation and reproductive physiology.
- Write information clearly in weekly reports
- Visit libraries and make notes of the upcoming lectures.
- Work effectively as an individual or part of a team
- Use scientific resources to collect the information.
- Be able to analyses data and compare it with other studies.
- Demonstrate effective communication skills in the form of student led group presentations.
- Demonstrate skills in working effectively with others as a member of a team.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1			
1.2			
2.0	**Cognitive Skills**		
2.1			
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1			
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1			
4.2			
5.0	**Psychomotor(if any)**		

5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Paper presentation (seminar)		30%
2	Short essay		20%
3	Short written exam		10%
4	Long literature review		40%
5	TOTAL		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books related to emerging topics:

Animal Physiology, From Genes to Organisms (2nd edition); Editors: Sherwood, Klandorf Yancey.
Supplemental books: Anatomy, Biochemistry and Cell Biology texts.

- Carpenter, R. and Reddi, B. (2012): Neurophysiology: A Conceptual Approach, Fifth Edition 5th Edition Hodder Arnold.
- Marieb, E.N: Essential of Human Anatomy &Physiology. Seven edition, Benjamin Cummings.
- Wilson, J.A. : Principles of animal physiology. Second edi, Collier Macmillan.
- DI Lebovic, JD Gordon, RN Taylor (2005): Reproductive Endocrinology and Infertility: Handbook for Clinicians. Scrub Hill Press

2. List Essential References Materials (Journals, Reports, etc.)

(1)- Journal related to emerging topics of advanced physiology
(2)-

- Frank, S. (2002) Immunology and Evolution of Infectious Disease, Princeton University Press.
- Journal of Animal Physiology and Animal Nutrition (Wiley Online Library)
- Biochemistry & Physiology: Open Access
- Endocrinology & Metabolic Syndrome
- Acta Physiologica (Wiley Online Library)
- Experimental physiology (Wiley Online Library)
- Frontiers in physiology (Open Access)
- Frontiers in physiology (Open Access)

Sites related to emerging topics such as:
http://people.uncw.edu/hadleyn/549_syllabus.pdf
https://www.clemson.edu/academics/programs/thinks2/documents/scholars/syllabi_F17/AVS%204650-6650%20Advanced%20Physiology%20I.pdf
http://animal.ifas.ufl.edu/teaching/2016_fall_syllabi/docs/6932_nelson.pdf
https://www.cpp.edu/~seskandari/documents/ZOO428_Syllabus_Winter_2016.pdf
http://www.dphu.org/uploads/attachements/books/books_2287_0.pdf
https://ib.berkeley.edu/sites/default/files/undergrad/syllabus/IB%20148_Fa14.pdf
https://ib.berkeley.edu/sites/default/files/undergrad/syllabus/IB%20148_Fa14.pdf

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.
(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

(1)- Questionnaires / students opinion survey
(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

1)- Revision of student answer papers / assignments by another staff member.
(2)- Analysis the grades of students.

3. Procedures for Teaching Development

(1)- Preparing the course as PPT.
(2)- Using scientific youtubes.
(3)- Coupling the theoretical part with laboratory part
(4)- Periodical revision of course content.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: _____

COURSE SPECIFICATIONS

Form

Course Title: **Emerging Topics in Entomology**

Course Code: **4013773-4**

Prof. Dr. Osama M. Sarhan

Institution: **Umm Al-Qura University**
Date:

College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Entomology 4013773-4**
2. Credit hours: **4 C. Hours**
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama M. Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

The main goal of the present course:

The present course designed to study selected topics related to PhD plan for the students. They will be study advanced insect biology, classification, toxicology, management of pest and reproduction. Apply recent molecular approaches. Use recent theories and analytical methodology in the field of entomology and related topics. Manage biological control of crop pests and weeds, integrated pest management, insect victors of plant viruses and other pathogens and, Vertebrate pest management.

1. The main objective of this course

The main emerging goals that can be selected according PhD plan:

- **Advanced insect morphology, systematics, anatomy, ecology, behavior.**
- **Advanced insect physiology, nutrition.**
- **Advanced insecticidal toxicology, techniques of plant protection, biological control of crop pests and weed, Pest of field crops and vertebrate pest management, and advanced integrated pest management**
- **Storage and commercial entomology**
- **Advanced acarology**
- **Advanced host plant resistance**
- **Advanced pathology**
- **Insect victors of plant viruses and other pathogens**
- **Soil arthropods and their managements**
- **Reproduction and immature stages of insects**
- **Molecular approaches in entomological research**
- **Organize and lead team work efficiently.**

- **Providing the students with the advanced knowledge, recent theories and analytical methodology in the field of entomology and related topics.**
- **Acquiring the students the tools to determine the ongoing problems in the field of entomology and attain the proper solutions.**
- **Developing the students' ability to organize and manage time, work and communicate effectively in a team considering the ethics and legal principles necessary for professional practice in the field of entomology and related topics.**
- **Acquiring the student the general and professional skills necessary to communicate with the society to fill full its different requirements in the field of entomology.**
- **Acquiring the student the skills of the think independently, set tasks and dealing with scientific patents considering property right.**
- **Developing the capability of the students to apply specialized knowledge, integrate it and make decisions in different professional contexts in the field of entomology and related topics.**
- **Applied entomology: Methods and techniques in insect collections, identification and preparation for storage.**
- **Principles of applied entomology. Economic importance of insects, including elements of chemical and biology control.**

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The present course designed to study some topics related to PhD plan for the students. Entomology providing the students with the advanced knowledge, recent theories and analytical methodology and field problems in the field of entomology and attain the proper solutions. Acquiring the student the general and professional skills necessary to communicate with the society to fillfull its different requirements in the field of entomology. Developing the capability of the students to apply specialized knowledge, integrate it and make decisions in different professional contexts in the field of entomology and related topics. The following emerging topics include insect morphology, systematics, behavior, advanced insect anatomy, physiology and nutrition, advanced insect ecology, advanced insecticide toxicology, techniques in plant protection, insect pathology, advanced pest field crops and host plant resistance, storage entomology, advanced acarology, Advanced integrated pest management and biological control of crop pests and weeds, insect victors of plant viruses and other pathogens, soil arthropods and their managements, commercial entomology, Vertebrate pest management, Immature stages of insects, and Molecular approaches in entomological research

1. Topics to be Covered

List of Emerging Topics	No. of Weeks	Contact hours
Explain the Modern theories and fundamentals of learning in entomology and related fields.		
Define the mutual influence between professional practice and its impact on the environment considering attitudes and ethical basis necessary for professional practice in entomology and related topics.		
Describe the modern scientific facts, concepts, principles and techniques applied in the field of entomology and related topics.		
Identify the developmental progress of entomology and related studied topics.		
Mention the recent concepts of bio-diversity, terminology, nomenclature, and classification systems of insects.		
Demonstrate the different morphological developmental stages and the anatomical aspects of the different body systems of insects.		
Insect morphology, advanced insect anatomy and systematics		
Advanced Insect physiology, behavior and nutrition		
Advanced Insect ecology		

Advanced insecticide toxicology		
Techniques in plant protection		
Recent trends in biological control of crop pests and weeds		
Pest of field crops and vertebrate pest management		
Advanced integrated pest management		
Storage and Commercial entomology		
Advanced acarology		
Advanced host plant resistance		
Insect pathology		
Insect victors of plant viruses and other pathogens		
Soil arthropods and their managements		
Reproduction and immature stages of insects		
Molecular approaches in entomological research		
total	16	64

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	64					64
Credit	4					4

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

After select some emerging topics for this course, students will be able to:

- Differentiate insects morphologically,
- To classify and dissect insect samples,
- To know insect ecology and behavior.
- To understand insect physiology, nutrition.
- To manipulate insecticidal toxicology, techniques of plant protection, biological control of crop pests and weed, Pest of field crops and vertebrate pest management, and advanced integrated pest management
- To apply storage and commercial entomology
- To assimilate acarology
- To develop host plant resistance
- To avail insect pathology
- To manage insect victors of plant viruses and other pathogens
- To develop the commercial benefits of soil arthropods and their managements
- To control insect reproduction and immature stages of insects
- To apply molecular approaches in entomological research
- To explain the Modern theories and fundamentals of learning in entomology and related fields.
- Define the mutual influence between professional practice and its impact on the environment considering attitudes and ethical basis necessary for professional practice in entomology and related topics.
- Describe the modern scientific facts, concepts, principles and techniques applied in the field of entomology and related topics.
- Identify the developmental progress of entomology and related studied topics.
- Mention the recent concepts of bio-diversity, terminology, nomenclature, and classification systems of insects.
- Demonstrate the different morphological developmental stages and the anatomical aspects of the different body systems of insects.

Also, students will be able to:

- Organize and lead team work efficiently.
- Work independently and/ or as a part of a team.
- Mange time efficiently.
- Utilize various sources to get the required knowledge and informations.

- **Make use of the various ways of communications to improve professional performance in the field of entomology and related fields.**
- **Indicate personal learning requirement.**
- **Set up rules and means to control professional performance of the team.**
- **Acquire self- and life-long learning.**
- **Write information clearly in weekly reports**
- **Visit libraries and make notes of the upcoming lectures.**
- **Work effectively as an individual or part of a team**
- **Use scientific resources to collect the information.**
- **Be able to analyses data and compare it with other studies.**
- **Demonstrate effective communication skills in the form of student led group presentations.**
- **Demonstrate skills in working effectively with others as a member of a team.**

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1			
1.2			
2.0	**Cognitive Skills**		
2.1			
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1			
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1			
4.2			
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	**Paper presentation (seminar)**		**30%**
2	**Short essay**		**20%**
3	**Short written exam**		**10%**
4	**Long literature review**		**40%**
5	**TOTAL**		**100%**

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books related to the selected topics:

2. List Essential References Materials (Journals, Reports, etc.)

Sites related to emerging topics Such as

http://www.eksu.edu.ng/wp-content/uploads/2010/06/ZOOLOGY%20COURSE%20CONTENT%20SPECIFICATIONS.pdf
https://entomology.rutgers.edu/undergraduate/courses/UrbanEntSyllabus.pdf
https://entomology.osu.edu/courses/entmlgy-4000
https://entomology.osu.edu/sites/ent/files/syllabuses/ENTMLGY4000_GenEnt.pdf
http://www.shsu.edu/academics/education/center-for-assessment-and-accreditation/documents/raise-your-hand-texas-science/BIOL%204410%20GENERAL%20ENTOMOLOGY.pdf
http://sib.illinois.edu/course/syllabi/IB%20444.pdf

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.
(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

(1)- Questionnaires / students opinion survey
(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

1)- Revision of student answer papers / assignments by another staff member.
(2)- Analysis the grades of students.

3. Procedures for Teaching Development

(1)- Preparing the course as PPT. **(2)- Using scientific youtubes.** **(3)- Coupling the theoretical part with laboratory part** **(4)- Periodical revision of course content.**
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor _____

Signature: _____ **Date Completed:** _____

Program Coordinator: _____

Signature: _____ **Date Received:** _____

Name of Course Instructor: _____

Signature: _____ **Date Completed:** _____

Program Coordinator: _____

Signature: _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Biotechnology

Course Code: 4013774-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University** Date:
College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Biotechnology (4013774-4)**
2. Credit hours:
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course
The main goal of the course is to introduce an advance understanding of

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course includes different topics that can be needed by PhD student program. For PhD plan, student choose 3-4 topics:
Advanced Biological Chemistry; Molecular Biology; Environmental Biotechnology; Cell Biology; Genetic Engineering; Immunology; Principles of Bacteriology and Virology; Plant Biotechnology; Animal Biotechnology; Bioprocess engineering &Fermentation Technology; Data Base Management and IPR in Biotechnology; Advanced Genetics; Bioinformatics; Scientific Research and Communications; Food Technology and Neutrigenomics; Genomics and Proteomics; Biochemical and biophysical techniques; Exercises in Biochemical and Biophysical techniques; Nanobiotechnology; Stem Cell Technology and Regenerative Medicines; Agricultural Biotechnology;
Exercises in advanced Biological Chemistry; molecular and cell biology; environmental biotechnology; genetic engineering; immunology; plant biotechnology; bacteriology and virology; animal biotechnology; bioprocess engineering; bioinformatics.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
This course include 3-4 topics according to student PhD plan		
Advanced Biological Chemistry and Molecular Biology		
Molecular Cell Biology; Bacteriology and Virology; Stem Cell Technology		
Environmental Biotechnology		
Genetic Engineering: Plant Biotechnology or Animal Biotechnology		
Bioprocess engineering &Fermentation Technology		
Immunology		
Advanced Genetics; Genomics and Proteomics		
Scientific Research and Communications		
Food Technology and Neutrigenomics		
Exercises in advanced Biological Chemistry; molecular and cell biology; environmental biotechnology; genetic engineering; immunology; plant biotechnology; bacteriology and virology; animal biotechnology; bioprocess engineering; bioinformatics.		
Biochemical; biophysical techniques or Nanobiotechnology		
Bioinformatics, Data Base Management in Biotechnology		
Exercises in advanced biological chemistry; molecular and cell biology; environmental biotechnology; genetic engineering; immunology; plant biotechnology; bacteriology and virology; animal biotechnology; bioprocess engineering; bioinformatics.		
Total	30	64

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- Understand the biological chemistry and molecular Biology
- Learn environmental biotechnology
- Demonstrate cell biology, genetic engineering, proteomics and immunology
- Apply molecular bacteriology and virology
- Understand Animal biotechnology, plant or agricultural biotechnology
- Apply food Technology; Neutrigenomics or bioprocess engineering and fermentation technology
- Management of scientific database of biotechnology, communications and bioinformatics
- Apply biochemical and biophysical techniques or Nano biotechnology
- Exercises in advanced Biological Chemistry; molecular and cell biology; environmental biotechnology; genetic engineering; immunology; plant biotechnology; bacteriology and virology; animal biotechnology; bioprocess engineering; bioinformatics.
- Write information clearly in weekly reports
- Visit libraries and make notes of the upcoming lectures.
- Work effectively as an individual or part of a team
- Use scientific resources to collect the information.
- Be able to analyses data and compare it with other studies.
- Demonstrate effective communication skills in the form of student led group presentations.
- Demonstrate skills in working effectively with others as a member of a team.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1			
1.2			
2.0	**Cognitive Skills**		
2.1			
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1			
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1			
4.2			
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	**Paper presentation (seminar)**		**30%**
2	**Short essay**		**20%**
3	**Short written exam**		**10%**
4	**Long literature review**		**40%**
5	**TOTAL**		**100%**

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:

2. List Essential References Materials (Journals, Reports, etc.)

(1)- Journal related to the selected topics
(2)- Sites related to the selected topics
http://www.unipune.ac.in/Syllabi_PDF/revised_2013/sci/15_M.Sc.%20I%20Biotechnology.pdf
https://icar.org.in/files/edu/Revised-PG-Course-Curricula-and-Syllabi/Biotech.%2030.4.2009.pdf
http://www.wbut.ac.in/syllabus/MSc_Biotechnology_Syllabus_Structure-2015.pdf

http://www.wbut.ac.in/syllabus/Biotechnology_Syllabus_old.pdf http://www.srmuniv.ac.in/sites/default/files/files/btech_syll_biotech_r2008-10.pdf http://www.gujaratuniversity.ac.in/web/data/pdfs/syllabus/Msc-Bio-Technology%20Final%2030.pdf http://dbtindia.nic.in/wp-content/uploads/M.Sc_.-General-Biotechnology.pdf https://www.keralauniversity.ac.in/downloads/mscbtsyllabus1527758072.pdf https://www.ntnu.no/studieinformasjon/realfag/2014-2015/Biotechnology.pdf
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) **(1)- Class room is already provided with data show**
2. Technology resources (AV, data show, Smart Board, software, etc.) **(1)- Class rooms are equipped with data show.** **(2)- A computer lab is required and connected to the network for students to gather their data and study materials**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **(1)- Questionnaires / students opinion survey** **(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting**
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department **1)- Revision of student answer papers / assignments by another staff member.** **(2)- Analysis the grades of students.**
3. Procedures for Teaching Development **(1)- Preparing the course as PPT.** **(2)- Using scientific youtubes.** **(3)- Coupling the theoretical part with laboratory part** **(4)- Periodical revision of course content.**
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ **Date Completed:** _____

Program Coordinator: _____

Signature: _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Stem cell Biology

Course Code: 4013775-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University** Date:

College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Stem cell Biology (4013775-4)**
2. Credit hours:
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

The present course include numerous emerging topics to select target topics according to student PhD plan: The main goal are:

The course will provide students with knowledge of wide-ranging topics related to stem cell and regenerative biology, including principles in stem cell biology, pluripotency, stem cell basics, cloning, tissue engineering, research on animal models of regeneration, cell reprogramming, adult stem cells, cancer stem cells, animal models of regeneration, therapeutic prospects of stem cells, and tissue engineering, research on animal models of regeneration, tissue engineering, and the political and ethical issues surrounding the stem cell debate.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Stem cell basics; stem cell epigenetics; unique characteristics of stem cells.		
Types of stem cell (germ-line, embryonic, mesenchymal, hematopoietic stem cells		
stem cell proliferation and migration in adult, Somatic cell reprogramming		
Neural induction and differentiation of pluripotent stem cells		
Research studies in the field of stem cell therapy.		
Tissue engineering using stem cell		
Stem cell research: policies and ethics		
Stem cells and cancer		
Using the basic and modern skills in the field of stem cells.		

Total	**30**	**64**

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- **Described the stem cells in mammalian.**
- **Mastering the culture stem cells.**
- **Understand the culture stem cells.**
- **List the Properties that define a stem cell**
- **Learn the basics of stem cell biology and describe the types of stem cells**
- **Understand the unique characteristics of stem cells.**
- **To apply research studies in the field of stem cell.**
- **To evaluate of variability and differentiation between embryonic stem cells and the extent.**
- **Mastering basic and modern skills in the field of stem cells.**
- **Explain how stem cells are derived for scientific research;**
- **Compare and contrast tissue-specific stem cell types (blood, skin), and the basic mechanisms that regulate them;**
- **Compare and contrast invertebrate and vertebrate animal models of regeneration research; and,**
- **Assess the ethical and political issues related to stem cell research.**
- **Present information clearly in the form of verbal reports/ seminar or poster presentation.**
- **Communicate complex ideas and arguments in a clear, concise and effective manner.**
- **Work effectively as an individual or part of a team.**
- **Use scientific resources to collect the information.**
- **Be able to analyses data and compare it with other studies.**
- **Demonstrate effective communication skills in the form of student led group presentations.**
- **Demonstrate skills in working effectively with others as a member of a team.**

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1			
1.2			
2.0	**Cognitive Skills**		
2.1			
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1			
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1			
4.2			
5.0	**Psychomotor(if any)**		

5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Paper presentation (seminar)		30%
2	Short essay		20%
3	Short written exam		10%
4	Long literature review		40%
5	TOTAL		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:

- **Lanza, R., Gearhart, J., Hogan, B., Melton, D., Pederson, R., Thomas, E.D., Thomson, J., Wilmut, S.I., 2009. Essentials of Stem Cell Biology, 2nd Edition. Elsevier Inc. ISBN-13: 978-0123747297**
- **Knoepfler, P., 2013. Stem Cells: An Insider's Guide, 1st Edition. World scientific Publishing Co. Ltd. ISBN-13: 978-9814508803**

2. List Essential References Materials (Journals, Reports, etc.)

(1)- Journals related to emerging topics
(2)- sites related to emerging topics

- **Nature (Nature Publishing Group)**
- **Cell (Science Direct)**
- **Stem Cell (Wiley)**
- **Developmental (The Company of Biologists)**

https://ki.se/en/selma/syllabus/2QA163
http://www.ncrm.org/feat/courses/msc/course%20curriculum.pdf
. http://www.hhmi.org/biointeractive/stemcells/index.html http://www.cirm.ca.gov/about/default.asp http://www.isscr.org/
http://www.sci.sdsu.edu/bioadvise/syllabi/Bio596StemCells_F09.pdf
http://www.sci.sdsu.edu/bioadvise/syllabi/Bio596_Stem%20Cells_F10.pdf
https://sdsu-dspace.calstate.edu/bitstream/handle/10211.10/4956/BIOL589%20Syllabus%20-%20Fall%202013-1.pdf?sequence=1
https://cpb-us-w2.wpmucdn.com/u.osu.edu/dist/5/14000/files/2016/01/NEW-ANAND-STEM-CELL-COURSE-SYLLABUS-and-TEACHING-SCHEDULE-TABLE-4-2atpeqo.pdf
http://www3.jabsom.hawaii.edu/Grad_DRB/courses/DRB650_2012.pdf

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show. **(2)- A computer lab is required and connected to the network for students to gather their data and study materials**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **(1)- Questionnaires / students opinion survey** **(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting**
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department **1)- Revision of student answer papers / assignments by another staff member.** **(2)- Analysis the grades of students.**
3. Procedures for Teaching Development **(1)- Preparing the course as PPT.** **(2)- Using scientific youtubes.** **(3)- Coupling the theoretical part with laboratory part** **(4)- Periodical revision of course content.**
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: _____

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Parasitology

Course Code: 4013776-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University**
Date:

College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Parasitology (4013776-4)**
2. Credit hours: **4 Credit hours**
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

This course is designed to PhD programs. It include wide range of emerging topics to select some target topics related to the student PhD plan:

Parasite transmission of parasites and the factors that influence parasite transmission. Defense mechanisms against parasitic infections and mechanisms of co-infections (e.g. parasite HIV co-infection). Pathological mechanism, factors influencing pathology and damage to specific organs. Controlling parasites and treating parasitic diseases. Study wide range of protozoa, helminthes, nematodes and arthropod parasites. survey and biology of protozoan, helminth, nematode, and arthropod parasites from the standpoint of morphology, taxonomy, life histories and social economic effects of parasites..

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The present course provides students of PhD program wide range topics to select some of them according his PhD plan. It introduces a broad overview of parasitology, covering important groups and host/parasite relationships among all taxa from lower vertebrates through mammals (including humans) and animal with a survey and biology of protozoan, helminth, nematode, and arthropod parasites from the standpoint of morphology, taxonomy, life histories and social economic effects of parasites. Study physiology, epidemiology, diagnosis and control of major parasites of economic importance with special reference to tropical diseases, such as Malaria, Trypanosomiasis, Schistosomiasis, Filariasis, Coccidiosis, Leishmaniasis, Dracunculiasis, Onchoecerciasis and Ancylostimiasis, Immunology; Social-economic effects

of parasites. Potential beneficial use of parasites. Finally identification of parasites and treatment and control will be discussed.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Biology of the parasitic protozoans, helminths, and arthropods of humans and domestic animals.		
Morphology, form and function, life cycles, symptomatology, and pathogenesis of representative taxa from these major parasitic groups.		
Economic consequences of parasitic diseases		
Protozoans parasites: Coccidia – Eimeria, Cyclospora, Sarcocystis, Toxoplasma, Neospora, Leishmania, Giardia and Trichomonads		
Major helminth parasites their taxonomy, life cycle and harms caused		
Major nematods parasites, their taxonomy, life cycle and harms caused		
Arthropods: Fleas, Flies, Maggots, Lice, Bed Bugs,Ticks and Tick, and Mites and harms caused		
Diagnosis, treatment and control of parasitic infections in humans and in livestock and companion animals.		
Epidemiology, control and treatment for the most important parasitic diseases of humans.		
Selected topics in parasitology of regional interest or pertaining to emerging diseases.		
Presentation: Synthesize information and evaluate published literature regarding a current and important issue in parasitology.		
Total	30	64

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- Demonstrate and understanding of the diversity of parasites and symbiotic associations, and their dynamic and populational nature.
- Demonstrate familiarity with common protozoan and helminth parasites of humans as well as some related parasites of livestock and companion animals.
- Demonstrate an understanding of the challenges in diagnosis, treatment and control of parasitic infections in humans and in livestock and companion animals.
- Interpret data and use evidence to address real-life problems in Parasitology in class, on writing assignments, and during exams.
- Demonstrate an understanding of the roles of parasites and of infectious diseases on the ecology of their hosts, particularly the relationships among parasites, hosts and the environment, and of the role of parasitism in the evolution of life on earth.
- Students will be expected to recognize and identify important aspects of the life cycles, epidemiology, and control and treatment for the most important parasitic diseases of humans.
- Demonstrate the ability to communicate scientific concepts and analytical arguments clearly and concisely in writing.
- Demonstrate the ability to evaluate a biological problem and determine which aspects are understood and which are not understood.
- Write information clearly in weekly reports
- Visit libraries and make notes of the upcoming lectures.
- Work effectively as an individual or part of a team
- Use scientific resources to collect the information.
- Be able to analyses data and compare it with other studies.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1			
1.2			
2.0	Cognitive Skills		
2.1			
2.2			
3.0	Interpersonal Skills & Responsibility		
3.1			
3.2			
4.0	Communication, Information Technology, Numerical		
4.1			
4.2			
5.0	Psychomotor(if any)		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Paper presentation (seminar)		30%
2	Short essay		20%
3	Short written exam		10%
4	Long literature review		40%
5	TOTAL		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:

2. List Essential References Materials (Journals, Reports, etc.)

(1)- Journals related to the selected topics
(2)-

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

https://www.angelo.edu/courses/syllabi/201820/21283.pdf
http://www.bio.tamu.edu/wp-content/uploads/2016/07/BIOL_VTPB-487-Syllabus-2015.pdf

https://www.geneseo.edu/sites/default/files/sites/biology/BIOL%20342%20MUENCH%20SUSAN.pdf
https://microbiology.science.oregonstate.edu/sites/microbiology.science.oregonstate.edu/files/MB%20480_580%20syllabus.pdf
http://faculty.evansville.edu/de3/b43403/B434_syllabus_06.pdf
http://www.tamuc.edu/academics/cvSyllabi/syllabi/201680/81941.pdf

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.
(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

(1)- Questionnaires / students opinion survey
(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

1)- Revision of student answer papers / assignments by another staff member.
(2)- Analysis the grades of students.

3. Procedures for Teaching Development

(1)- Preparing the course as PPT.
(2)- Using scientific youtubes.
(3)- Coupling the theoretical part with laboratory part
(4)- Periodical revision of course content.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ **Date Completed:** _____

Program Coordinator: _____

Signature: _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Endocrinology

Course Code: 4013777-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University**
Date:

College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Endocrinology (4013777-4)**
2. Credit hours: **4 Credit hours**
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

The main goal of the course is to introduce an advance understanding of
Study Cell biology and biochemistry of peptide pro-hormone processing; hormones biosynthesis, releasing factors, effects, degradation and elimination, disorders of metabolism and assays; genomic and non-genomic action steroid hormone; Hormonal regulation of testicular and ovarian functions; hormones of bone remodeling; regulation and releasing of Hypothalamic, growth and reproductive hormones; role of hepatic gluconeogenesis and its key enzyme, fructose 1, 6 bisphosphatase in regulating appetite and obesity.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The present course introduce open topics to accommodate PhD program and the final topics will be used according to the student PhD plan.

The main topics include Study steroid hormone action; hormonal regulation and function; hypothalamic; hormonal regulation of male and female reproductive functions; role of prostaglandins in the reproductive system; relation between obesity regulation and hepatic gluconeogenesis; roles of AMP-kinases and mTOR in energy regulation; Hormonal regulation of bone remodeling; hormonal signaling mechanisms, pancreatic hormones, gut hormones, thyroid, parathyroid hormones, neuroendocrinology, steroids, and growth factors. In addition, the role of hormones

and growth factors in metabolism, reproduction and fetal maturation; the interrelation of the nervous system, the secretion of the hormones, hormones and animal behavior, hormones homeostasis.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Advance study on the hormones biosynthesis, releasing factors, effects, degradation and elimination, disorders of metabolism and assays.		
Study steroid hormone action: genomic versus non-genomic		
Hormonal regulation of testicular and ovarian functions		
Hypothalamic releasing hormones – recent progress		
Regulation of growth hormone release		
Cell biology and biochemistry of peptide pro-hormone processing		
Mechanism of action of insulin		
Inhibin and related hormones		
Role of G proteins in hormone action		
Regulation of hormone action by protein phosphatases		
Role of intermediates of the phophatidyl inositol pathways as second messengers		
Role of prostaglandins in the reproductive system		
Regulation of arachidonic acid release		
Role of food reward in obesity epidemics		
Interaction of the reproductive axis with energy balance		
Menopause onset: triggers and mechanisms?		
Adolescence onset: triggers and mechanisms?		
Morningness and eveningness: links to circadian pacemaker function?		
Angiogenesis and diabetes		
Why is the hunt for anti-obesity drugs so unsuccessful? Limitations in anti-obesity drug development		
Mammalian sirtuins and energy metabolism		
The roles of AMP-kinases and mTOR in energy regulation		
Obesity, inflammation, and insulin resistance		
Selective estrogen response modifiers (SERMS) in breast cancer therapy – their mechanism of action The interactions between growth factor signaling and the integrin system		
B-Adrenergic receptors and their involvement in cardiovascular disease (e.g. congestive heart failure) Androgen receptors in the development and progression of prostate cancer		
Crosstalk between the immune and hormonal systems		
Coping with stress: hormonal response of the body		
Diabetes: a disease of plenty? Causes and consequences of insulin resistance in diabetes		
Hormonal regulation of bone remodeling		
The role of hepatic gluconeogenesis and its key enzyme, fructose 1, 6 bisphosphatase in regulating appetite and obesity Bariatric surgery for type 2 diabetes: weight loss independent mechanism?		
IGF-dependent and-independent functions of IGF binding proteins		
Leptin resistance: causes and consequences		
Total	30	64

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- **The student should have a solid understanding of the science of Endocrinology and have acquired experience in written and oral presentation of biomedical concepts.**
- **Understand the structure and function of the endocrine system and the interrelation on the hypothalamus and the endocrine gland**

- **Determine the hormones biosynthesis, releasing factors, effects, degradation and elimination, disorders of metabolism and assays.**
- **Demonstrate the Fertilization, hormonal control of pregnancy and function of the placenta**
- **Write information clearly in weekly reports**
- **Visit libraries and make notes of the upcoming lectures.**
- **Work effectively as an individual or part of a team**
- **Use scientific resources to collect the information.**
- **Be able to analyses data and compare it with other studies.**
- **Demonstrate effective communication skills in the form of student led group presentations.**
- **Demonstrate skills in working effectively with others as a member of a team.**
- **Write information clearly in weekly reports**
- **Visit libraries and make notes of the upcoming lectures.**
- **Work effectively as an individual or part of a team**
- **Use scientific resources to collect the information.**
- **Be able to analyses data and compare it with other studies.**
- **Demonstrate effective communication skills in the form of student led group presentations.**
- **Demonstrate skills in working effectively with others as a member of a team.**

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1			
1.2			
2.0	Cognitive Skills		
2.1			
2.2			
3.0	Interpersonal Skills & Responsibility		
3.1			
3.2			
4.0	Communication, Information Technology, Numerical		
4.1			
4.2			
5.0	Psychomotor(if any)		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Paper presentation (seminar)		30%
2	Short essay		20%
3	Short written exam		10%
4	Long literature review		40%
5	TOTAL		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.

Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:

- **DI Lebovic, JD Gordon, RN Taylor (2005): Reproductive Endocrinology and Infertility: Handbook for Clinicians. Scrub Hill Press**
- **Nussey S, Whitehead S(2001) Endocrinology: An Integrated Approach Oxford: BIOS Scientific Publishers; 2001.**
- **Greenspan, F.S, Strewler, G.J (1997): Basic &Clinical Endocrinology, Fifth edi, Appleton& Lange.**
- **Brook, C. and Marshall, N. (1996). Essential Endocrinology, Blackwell Science UK.**
- **Braverman, L.E. (2003): Diseases of the thyroid, Human Press, Totowa, New Jersey.**

2. List Essential References Materials (Journals, Reports, etc.)

(1)- journal related to topics

(2)- sites related to topics

(1)- International journal of endocrinology
(2)- Endocrinology (Oxford academic)
(3)- Endocrinology & Metabolic Syndrome
(4)- Frontiers in endocrinology, Experimental endocrinology
(5)- European Journal of Endocrinology

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

https://www.endocrinesociety.org.au/downloads/AT_EndcrinologyAdultMedicine_Curricula.pdf
https://puls.sus.mcgill.ca/syllabus/u3/EXMD503_W2018.pdf
https://www.khanacademy.org/science/health-and-medicine/advanced-endocrine-system

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.
(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

(1)- Questionnaires / students opinion survey
(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

1)- Revision of student answer papers / assignments by another staff member.
(2)- Analysis the grades of students.

3. Procedures for Teaching Development

(1)- Preparing the course as PPT.

(2)- Using scientific youtubes. **(3)- Coupling the theoretical part with laboratory part** **(4)- Periodical revision of course content.**
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: _____

COURSE SPECIFICATIONS

Form

Course Title: **Emerging Topics in Animal Ecology**

Course Code: **4013778-4**

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University**
Date:

College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Animal Ecology (4013778-4)**
2. Credit hours:
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course
The main goal of the course is to introduce emerging topics of ecology:

Understand aims and scope of ecology. Learn major units of ecology; population, community, ecosystem, biosphere, environmental factors. Habitat, interrelations and estimation, niche, niche overlap, diffuse competition, coexistence and resources shift. Students will be percept and appreciate the importance of ecology in solving environmental problems. The concept of measurement and effects on organisms and populations, population growth and dynamics. Sampling and collection methods in the study of communities and ecosystem. Estimation of abundance, density, yield, cover and frequency of organisms. Statistical method in ecology – parametric and non-parametric test. Vegetation zones of West Africa, their climatic and edaphic features. Their floral and fauna composition. The wild-life resources of Arabia. Principles and management of wild-life in KSA. Dynamics and wild-life populations, conservation policies, problems and prospects. Conservation and development of natural resources including water, marine and wild animals. Lab: Field sampling techniques in various habitats, aquatic and terrestrial visits to various habitats. General survey of local invertebrate animals including mollusks, arthropods and vertebrates.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course study the relationship between organisms and their biotic and abiotic environments at three levels of biological hierarchy: individual organism, population, and community. Population characteristics, models of population dynamics, and the effect of ecological interactions on population regulation are discussed in detail. The structure and function of natural and man-made communities and the impact disturbances have on community structure are also examined. Students are led to appreciate the importance of ecology in solving environmental problems.
Lab: field trip as introduction to ecosystems. Apply an investigation of population growth: Exponential, Logistic and exponential growth models. Field sampling techniques in various habitats, aquatic and terrestrial visits to various habitats. Study energy flow and material distribution in terrestrial or aquatic ecosystems. General survey of local invertebrate animals including mollusks, arthropods and vertebrates. General survey of local invertebrate animals including mollusks, arthropods and vertebrates.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Introduction: Concepts of Ecology & Ecosystems		
Properties of Populations: Population fluctuations, cycles, growth, life history and population regulation.		
population Interactions: Competition, Predation, Parasitism and Mutualism		
Community Ecology: Structure and factors influencing communities and development		
Physiological Ecology: Water and solute balance; Energy and heat; response to environmental variation		
Aquatic Systems: Freshwater and Marine Ecosystems		
Terrestrial Ecosystems: Grasslands and Boreal Forest		
The relationship between organisms and their biotic and abiotic environments at three levels of biological hierarchy: individual organism, population, and community.		
Interrelations and Estimation of Importance of relationships The ecological niche, niche, niche overlap, diffuse competition, co-existence, resource shift.		
The wild-life resources of Arabia. Principles and management of wild-life in KSA. Dynamics and wild-life populations		
Conservation policies, problems and prospects and development of natural resources including water, marine and wild animals		
Pollution glossary, pollution and the food chains.		
Lab: field trip as introduction to ecosystems.		
Apply an investigation of population growth: Exponential, Logistic and exponential growth models.		
Study energy flow and material distribution in terrestrial or aquatic ecosystems.		
Field sampling techniques in various habitats, aquatic and terrestrial visits to various habitats General survey of local invertebrate animals including mollusks, arthropods and vertebrates.		
General survey of local invertebrate animals including mollusks, arthropods and vertebrates.		
Total	**14**	**64**

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will have or be able to:

- **Describe how interactions of organisms with their environment and other organisms give rise to patterns of species distribution and abundance.**
- **Describe biotic and abiotic factors affecting ecological processes at the individual, community and ecosystem levels.**
- **Explain the major processes influencing biodiversity in terrestrial and aquatic ecosystems.**
- **Define basic principles of ecology including population growth, ecological interactions, succession, and evolutionary change, and make predictions based on these principles.**
- **Discuss how the function of local and global ecosystems is being altered by human activity, and critique alternative strategies for minimizing human impact on biogeochemical cycles.**
- **Conduct basic field and analytical techniques in ecology such as habitat sampling and physiochemical characterization of populations and communities.**
- **Demonstrate familiarity with common approaches for statistical analysis and presentation of ecological data.**
- **Apply ecological principles to environmental challenges and conservation concerns.**
- **Develop an introductory understanding of ecology. This understanding will be in 4 major ecological sub-disciplines: population, community, ecosystem and global ecology.**
- **Be able to describe how the scientific method is applied in examples of ecological studies.**
- **Practice and apply numerical skills by compiling, summarizing and interpreting basic scientific data.**
- **Build critical thinking skills through the process of evaluating scientific information in Biol 228 laboratories and from the literature.**
- **Become familiar with the impacts of humans on ecological systems.**
- **Be able to describe mechanisms that support biological diversity at the individual, community, landscape, and global scales**
- **Develop a sense of place by acquiring new knowledge about the ecology of populations, communities and ecosystems of Saskatchewan and Canada**
- **Be familiar with The physical environment (climate, seasons)**
- **determine aquatic biomes, terrestrial biomes and density)**
- **Understand global climate change and its impact on ecosystems.**
- **Differentiate between Availability & hazards**
- **Understand growth vs. mortality,**
- **Distinguish individual variations**
- **Coping with environmental variability**
- **Understand various habitats**
- **Good understanding of daily and seasonal movements**
- **Models Present information clearly in the form of verbal reports.**
- **Communicate complex ideas and arguments in a clear, concise and effective manner.**
- **Work effectively as an individual or part of a team.**
- **Use conventional and electronic resources to collect, select and organize complex scientific information Write information clearly in weekly reports**
- **Visit libraries and make notes of the upcoming lectures.**
- **Work effectively as an individual or part of a team**
- **Use scientific resources to collect the information.**
- **Be able to analyses data and compare it with other studies.**
- **Demonstrate effective communication skills in the form of student led group presentations.**
- **Demonstrate skills in working effectively with others as a member of a team.**

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1			
1.2			
2.0	Cognitive Skills		
2.1			
2.2			
3.0	Interpersonal Skills & Responsibility		
3.1			
3.2			
4.0	Communication, Information Technology, Numerical		
4.1			
4.2			
5.0	Psychomotor(if any)		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Paper presentation (seminar)		30%
2	Short essay		20%
3	Short written exam		10%
4	Long literature review		40%
5	TOTAL		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books according to the selected topics such as:

- **Booth,W.C., G.G.Colomb and J.M.Williams. 2008. The craft of research.3rd edn. The University Of Chicago Press, Chicago, IL.**
- **Railsback, S.F., and V. Grimm. 2011. Agent- based and individual- based modeling: A practical introduction. Princeton University Press, Princeton, NJ.**
- **Bowman, W. D. S. D. Hacker, and M. L. Cain. 2017. Ecology. Fourth Edition. Sinauer Associates. Sunderland, Massachusetts, USA. 594 pp. ISBN-13: 978-160-535-6181.**

2. List Essential References Materials (Journals, Reports, etc.)

Selected journals according to different fields of ecology and the studied topics:
(1)- journal of animal ecology
(2)- other related journals

(3)- sites related to emerging topics such as: **http://www.eksu.edu.ng/wp-content/uploads/2010/06/ZOOLOGY%20COURSE%20CONTENT%20SPECIFICATIONS.pdf** **http://milanovichlab.weebly.com/uploads/2/3/5/2/23521618/biol_265_fall_2013_syllabus.pdf** **http://advanced.jhu.edu/wp-content/uploads/2018/05/420_611_81Santiago_Blay.pdf** **http://advanced.jhu.edu/wp-content/uploads/2018/05/420_611_81Santiago_Blay.pdf** **https://artsandscience.usask.ca/biology/undergraduates/syllabi2015/BIOL%20228%20Syllabus%202015-16.pdf** **https://artsandscience.usask.ca/biology/undergraduates/syllabi2015/BIOL%20228%20Syllabus%202015-16.pdf** **http://entomology.tamu.edu/wp-content/uploads/2014/03/ENTO-424.pdf**
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) **(1)- Class room is already provided with data show**
2. Technology resources (AV, data show, Smart Board, software, etc.) **(1)- Class rooms are equipped with data show.** **(2)- A computer lab is required and connected to the network for students to gather their data and study materials**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **(1)- Questionnaires / students opinion survey** **(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting**
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department **1)- Revision of student answer papers / assignments by another staff member.** **(2)- Analysis the grades of students.**
3. Procedures for Teaching Development **(1)- Preparing the course as PPT.** **(2)- Using scientific youtubes.** **(3)- Coupling the theoretical part with laboratory part** **(4)- Periodical revision of course content.**
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____ **Date Received:** _____

Elective course: Emerging topics in Genetics 4013779-4

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Genetics

Course Code: 4013779-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University** Date:
College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Genetics (4013779-4)**
2. Credit hours: **4 Credit hours**
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs): **PhD program in Zoology**
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered: **PhD program**
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

The present course contains emerging topics to be allowed for PhD program. The student selects some of these topics according his PhD plan.

It provides exposure to advanced topics in the field of genetics which are not otherwise covered in under-graduate courses. An emphasis is given to the area of complex genetic interactions between genes and their environment, and how these interactions produce their resultant phenotypes in Eukaryotes. The main goal of the course is to introduce an advance understanding basis of inheritance; cytogenetics; Non-Mendelian population genetics and developmental genetics; human genetics; genetic engineering; genom identification; genome editing repair, recombination mechanisms; genome markers, mapping and cloning; chromosome aberration (polyploidy, aneuploidy);sex chromosome; population genetics and developmental genetics (drosophila or plant).

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The present course contains emerging topics to be allowed for PhD program. The student selects some of these topics according his PhD plan.

This course will provide a framework for advanced study of a wide variety of genetic topics through direct interaction with published literature and active genetic researchers. The major objective of the course is to provide theoretical understanding of essential topics such as cytogenetics; basis of inheritance and to develop their knowledge about human genetics; pedigree analysis; human karyotype; blood grouping in humans, genetics counseling; quantitative genetics; genetic engineering; chromosome and genes; gene repair; gene identification; genome editing;

recombination mechanisms; genome markers, mapping and cloning; chromosome aberration (polyploidy, aneuploidy); extra chromosomal and epigenetic systems; sex chromosome and sex linkage; The physical and chemical nature of the genetic material, protein synthesis; mutation; non-Mendelian population genetics and developmental genetics (drosophila or plant). Student presentation include review article for recent publications of genetic topics related to his PhD plan.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
The gene as a unit of mutation and recombination; Allelic interactions – cistrons and operons		
Interactions suppressors, enhancers and epistasis; forward and reverse genetics approaches		
Meiosis segregation, assortment, chromosome mechanics and nondisjunction; Genes and chromosomes		
Quantitative genetics; genomic prediction;		
genes, mutations and genetic interactions; gene order, linearity, crossing over and recombination		
Tetrad analysis & sister strand exchange; recombination mechanisms; gene conversion and genome editing		
Chromosome variation – polyploidy, aneuploidy; genome features implications for markers, mapping & gene identification		
Molecular markers and genotype by sequencing; multipoint linkage mapping populations		
Multipoint Linkage mapping software demonstration; Map based applications – positional cloning qualitative traits		
genomes, chromosomes, markers and mapping		
Non Mendelian and developmental genetics (drosophila or plant); Population genetic; genotype by sequencing.		
Total	30	64

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- **Write information clearly in weekly reports**
- **Visit libraries and make notes of the upcoming lectures.**
- **Work effectively as an individual or part of a team**
- **Use scientific resources to collect the information.**
- **Be able to analyses data and compare it with other studies.**
- **Demonstrate effective communication skills in the form of student led group presentations.**
- **Demonstrate skills in working effectively with others as a member of a team.**

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1			
1.2			
2.0	Cognitive Skills		
2.1			
2.2			
3.0	Interpersonal Skills & Responsibility		
3.1			
3.2			
4.0	Communication, Information Technology, Numerical		
4.1			
4.2			
5.0	Psychomotor(if any)		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Paper presentation (seminar)		30%
2	Short essay		20%
3	Short written exam		10%
4	Long literature review		40%
5	TOTAL		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:

- **Understand Genetics (A molecular approach): 1988 4th edition. Rothwell NV. Oxford Univ. Press. New York**
- **Modern Genetic analysis 2002, 2nd ed.. Griggith AJF, Gelbart WM, Lewentin RC and Miller JH-**

2. List Essential References Materials (Journals, Reports, etc.)

(1)- journal related to the selected topics
(2)- text books related to the selected topics

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

http://www.eksu.edu.ng/wp-content/uploads/2010/06/ZOOLOGY%20COURSE%20CONTENT%20SPECIFICATIONS.pdf
https://www.uwo.ca/biology/pdf/undergraduate/2017-Biology-3595A-Course-Outline-2017.pdf
http://genetics.wustl.edu/bio5491/files/2016/01/Kornfeld-Lecture-1-2016.pdf

https://www.uta.edu/ra/real/syllabi/7867_8__5312_syllabus.pdf
http://pmcb.ifas.ufl.edu/pdf/PCB_5065_Fall_2018_Syllabus.pdf
http://pmcb.ifas.ufl.edu/pdf/PCB5065_Fall17_Syllabus.pdf
http://bio.classes.ucsc.edu/bio117a/syllabus.pdf
http://biology.uprm.edu/files/BIOL%206617.pdf

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.
(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

(1)- Questionnaires / students opinion survey
(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

1)- Revision of student answer papers / assignments by another staff member.
(2)- Analysis the grades of students.

3. Procedures for Teaching Development

(1)- Preparing the course as PPT.
(2)- Using scientific youtubes.
(3)- Coupling the theoretical part with laboratory part
(4)- Periodical revision of course content.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ **Date Completed:** _____

Program Coordinator: _____

Signature: _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Immunology

Course Code: 4013780-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University** Date:
College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Immunology (4013780-4)**
2. Credit hours: **4 Credit hours**
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

The present course designed for PhD program in department of biology, thus it contains emerging topics to accommodate the student needs in their PhD plans. The main goal of the course is to introduce an advance understanding of immunology: these topics includes:

Introduction to advanced immunology; antigen recognition; innate immunity; immune memory; mucosal immunity (immunity to Parasites); immunity to infection (viruses and bacteria); regulation of immune responses; T cell Development; B cell Development; primary T cell response; primary B cell response; different principles for vaccination; hyperactivity of the immune system during allergy; hypersensitiveness and autoimmunity; cell separation methods and flow cytometry with Fluorescence Activated Cell Sorter (FACS); rejection reactions after transplantation. Practical experiments and scientific articles presentation.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course contains numerous topics to select some major subjects to be study, these topics include: Introduction to advanced immunology; theory and methodology; the structure and function of the antibodies antigen presentation of MHC-molecules; T cell development, recognizing of antigen by T-cells Primary B cell Response, immunity that is mediated by T- or B-cells; development of lymphocytes, (their receptors and diversity); the role and function of the cytokines; regulation of immune responses, immune

memory, mucosal immunity (immunity to Parasites); immunity to viruses and bacteria, how the immune system functions (defense against bacterial and viral infections); different principles for vaccination; hyperactivity of the immune system during allergy; hypersensitiveness and autoimmunity; cell separation methods and flow cytometry with Fluorescence Activated Cell Sorter (FACS); rejection reactions after transplantation. Laboratory experiments includes: Principles of immunological methods are treated such as analysis of human effector cells against selected antigen with immunoassays; production of monoclonal antibodies; immunoassays; proliferation and cytotoxicity assays; detection of cytokines. Also, Presentation includes: scientific articles are presented and are discussed.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Introduction to Adv. Immunology; theory and methodology		
The structure and function of the antibodies antigen presentation of MHC-molecules.		
T cell development, recognizing of antigen by T-cells, Primary B cell response, immunity that is mediated by T- or B-cells		
Development of lymphocytes, their receptors and diversity, the role and function of the cytokines		
Regulation of immune responses, immune memory, mucosal immunity (immunity to Parasites)		
Immunity to viruses and bacteria, how the immune system functions of defense against bacterial and viral infections and different principles for vaccination		
Hyperactivity of the immune system during allergy; hypersensitiveness and autoimmunity		
Cell separation methods and flow cytometry with Fluorescence Activated Cell Sorter (FACS).		
Rejection reactions after transplantation		
Laboratory experiments includes: Principles of immunological methods are treated such as analysis of human effector cells against selected antigen with immunoassays; production of monoclonal antibodies; immunoassays; proliferation and cytotoxicitys assays; detection of cytokines;		
Presentation includes: scientific articles are presented and are discussed.		
Total	**30**	**64**

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- Understand immunology theory and methodology;
- Identify and differentiate the structure and function of the antibodies antigen presentation of MHC-molecules
- Demonstrate T cell development, recognizing of antigen by T-cells, Primary B cell Response, immunity that is mediated by T- or B-cells
- Identify the development of lymphocytes, their receptors and diversity
- To know the role and function of the cytokines
- Understand regulation of immune responses, immune memory, Immunity to parasites and microbial infections.

- **Understand cell separation methods and flow cytometry with Fluorescence Activated Cell Sorter (FACS) and**
- **Demonstrate rejection reactions after transplantation.**
- **Apply some aboratory experiments such vaccination and autoimmunity; human immunity against selected antigen; proliferation and cytotoxicitys assays; detection of cytokines;**
- **Presentation and discussion.**
- **Write information clearly in weekly reports**
- **Visit libraries and make notes of the upcoming lectures.**
- **Work effectively as an individual or part of a team**
- **Use scientific resources to collect the information.**
- **Be able to analyses data and compare it with other studies.**
- **Demonstrate effective communication skills in the form of student led group presentations.**
- **Demonstrate skills in working effectively with others as a member of a team.**

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
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1.2			
2.0	Cognitive Skills		
2.1			
2.2			
3.0	Interpersonal Skills & Responsibility		
3.1			
3.2			
4.0	Communication, Information Technology, Numerical		
4.1			
4.2			
5.0	Psychomotor(if any)		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Paper presentation (seminar)		30%
2	Short essay		20%
3	Short written exam		10%
4	Long literature review		40%
5	TOTAL		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks **Recent text books: Text books related to selected topics.**

2. List Essential References Materials (Journals, Reports, etc.)
(1)- Journals related to selected topics.
(2)- Sites related to selected topics.

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
http://www.tulane.edu/~jmclachLab/assets/advanced-immunology-syllabus-2017.pdf
https://ki.se/en/selma/syllabus/1BA040
http://www.tulane.edu/~jmclachLab/assets/advanced-immunology-syllabus-2017.pdf
https://www.uaf.edu/files/uafgov/12-13_47-GNC_BIOL-F6xx_REVISED-SYLLABUS_2-21-2014.pdf
https://ki.se/en/selma/syllabus/1BA040
https://www.biology.pitt.edu/sites/default/files/publication-images/undergrad-syllabi/BIOSC%201760%20Syllabus%202174.pdf
http://www.cns.nyu.edu/doctoral/courses/2008-2009/spring/immunology.pdf

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)
(1)- Class rooms are equipped with data show.
(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
(1)- Questionnaires / students opinion survey
(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
1)- Revision of student answer papers / assignments by another staff member.
(2)- Analysis the grades of students.

3. Procedures for Teaching Development
(1)- Preparing the course as PPT.
(2)- Using scientific youtubes.
(3)- Coupling the theoretical part with laboratory part
(4)- Periodical revision of course content.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____ **Date Received:** _____

Elective course: Emerging topics in Invertebrate zoology 4013781-4

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Invertebrate Zoology

Course Code: 4013781-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University** Date:

College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Invertebrate Zoology (4013781-4)**
2. Credit hours: **4 credit hours**
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

The subjects of the present course are elective to be used in PhD program, where every student can select topics that related to his PhD plan. The main goal of the course is to introduce an advance understanding of the following:

Study Invertebrate zoology includes all aspects of the taxonomy, to demonstrate an understanding of the fundamental differences among invertebrate taxa, and the relationships among taxa. Understand the characteristic morphology, internal structure "anatomy", function behavior, habitat, ecology, reproduction, evolution and phylogeny of the major groups of invertebrates will be discussed. To apply how to identify organisms based on morphology.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The course is for upper level graduate students. In this course, we will build upon the basic taxonomy, functional morphology, anatomy and physiology and reproduction of invertebrates by addressing these aspects with a focus on ecological and evolutionary processes that have driven the development of invertebrates, in addition, their economic importance. We will focus primarily on an overview of ecology and evolution of invertebrate phyla. Upon completion of this course students will be familiar with the primary literature and know how to search for relevant primary sources in this field. Students will be able to evaluate recent research as well as construct and present recent research results related to invertebrate ecology and evolution. Students apply Proposal presentations or research article.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Review of invertebrate phyla, phylogenetic relationships		
Study Invertebrate zoology includes all aspects of the taxonomy, morphology, internal structure "anatomy", function behavior, habitat, ecology, reproduction, evolution and phylogeny of the major groups of invertebrates will be discussed.		
Modern methods of animal of systematics and nomenclature: rules and interpretation, principles of classification. Biological classifications and their history. Hierarchy of categories and their taxa and their role in the environment and economic importance. Methods of animal classification publication. Chemical and numerical taxonomy		
Comparative study of Free Living Protozoa: Anatomy and Biology of Sarco-mastigophora (Sarcodina and Flagellata), Ciliata (Ciliophora), Sporozoa. Biology of protozoa: diagnostic features, diversity, feeding excretion, osmoregulation, reproduction and evolution of the Protozoa. Biology and diversity of the major classes, including Mastigophora. Sarcodina. Ciliata and Sporozoa, using special, fixed examples. Protozoa and diseases.		
Comparative study of the Porifera, Sponge biology and reproduction		
Comparative study of the Cnidaria: Anatomy and Biology of Cnidaria. Biology of Cnidaria. Body Plans and reproduction. Coral biology and Coral bleaching Coral reef ecosystems; health, diseases, and management		
Comparative study of Acoelomate (Flatworm): Anatomy and Biology of (Flatworm). Biology of platyhelmenthes. Reproduction		
Comparative study of Pseudocoelomate (Roundworms): Anatomy and Biology of Nematodes. Principal characteristics of Nematodes, morphology, position and outlines of classification of nematodes. Morphology and biology of local species and their economic importance. Nematological techniques. Reproduction		
Coelomate invertebrates: Organization and biology of coelomate invertebrate: Annelida, Economic importance and reproduction.		
The importance of the Arthropoda, exoskeleton, Chelicerata, Myriapoda, Crustacea. Reproduction		
Molluscs, Scaphopoda, Pelecypoda, Polyplacophora, Gastropoda, Cephalopoda. Economic importance and reproduction.		
Mollusca, Arthropoda, and Echinodermata. Biology of coelomate phyla and their Economic importance and reproduction.		
Echinoderms, Economic importance and reproduction. Deuterostomes,		
Proposal presentations		
Total	**30**	**64**

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- **Identify ecological and economic importance of marine invertebrates (demonstrate comprehension on exams, class discussions, group activities).**
- **Explain unique invertebrate adaptations in the context of ecological and environmental interactions (demonstrate comprehension through exams, class discussions, written concept summaries, group activities, and group presentations).**
- **Compare and contrast ecological and evolutionary advantages of invertebrate adaptations (demonstrate comprehension through team-based learning activities, group discussions, and group presentations). 4.**
- **Evaluate recent research on invertebrate ecology and evolution (through team-based learning activities, group and individual presentations, and group discussions).**
- **Demonstrate an understanding of the fundamental differences among invertebrate taxa, and the relationships among taxa.**
- **Demonstrate knowledge of basic phylogenetic principles.**
- **Demonstrate the ability to make careful observations of specimens.**
- **Demonstrate the ability to identify organisms based on morphology.**
- **Gain an appreciation for the diversity of animals.**
- **The student should be able to name 70% of the major invertebrate phyla on the lab exams.**
- **The student should be able to identify 70% of the parts of the invertebrate anatomy on the lab exams.**
- **The student should be able to discuss the invertebrate phyla on essay questions.**
- **Present information clearly in the form of verbal reports**
- **Communicate complex ideas and arguments in a clear, concise and effective manner**
- **Work effectively as an individual or part of a team**
- **Use conventional and electronic resources to collect, select and organize complex scientific information**
- **Be able to assimilate and synthesize data from multiple sources**
- **Demonstrate capacity for self-learning and independent thinking and to utilize problem solving skills**
- **Demonstrate effective communication skills in the form of student led group presentations.**
- **Demonstrate skills in working collegiately and effectively with others as a member of a team.**
- **Set priorities and link these with effective time management**
- **Critically evaluate their personal performance both as an individual and within a team**

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1			
1.2			
2.0	Cognitive Skills		
2.1			
2.2			
3.0	Interpersonal Skills & Responsibility		
3.1			
3.2			
4.0	Communication, Information Technology, Numerical		
4.1			
4.2			

5.0	Psychomotor(if any)		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Paper presentation (seminar)		30%
2	Short essay		20%
3	Short written exam		10%
4	Long literature review		40%
5	TOTAL		100%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:
Pechenik, Jan A. 2015. Biology of the Invertebrates. 7th Edition. McGraw-Hill. ISBN: 9781308347639.

2. List Essential References Materials (Journals, Reports, etc.)

1- **ISJ - Invertebrate Survival Journal.**
2- **Invertebrate Reproduction & Development**
3- **African Invertebrates**
4- **Journal of Crustacean Biology**

Other related journals
Other related sites

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

http://www.eksu.edu.ng/wp-content/uploads/2010/06/ZOOLOGY%20COURSE%20CONTENT%20SPECIFICATIONS.pdf
https://artsci.uc.edu/content/dam/artsci/departments/biology/Docs/Syllabi/520_syllabus_Uetz_2006.pdf
http://proxycheck.lib.umanitoba.ca/faculties/science/departments/bio_sciences/media/BIOL_3200.pdf
https://biology.usu.edu/education/courses/spring2017/Biol%2045406540.pdf
https://jbschram.weebly.com/uploads/3/1/3/5/31350463/schram.syllabus.pdf
http://deenr.rutgers.edu/undergrad/syllabi/324InvertZool.pdf

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.
(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **(1)- Questionnaires / students opinion survey** **(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting**
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department **1)- Revision of student answer papers / assignments by another staff member.** **(2)- Analysis the grades of students.**
3. Procedures for Teaching Development **(1)- Preparing the course as PPT.** **(2)- Using scientific youtubes.** **(3)- Coupling the theoretical part with laboratory part** **(4)- Periodical revision of course content.**
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: _____

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Vertebrate Zoology

Course Code: 4013782–4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University** Date:
College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Vertebrate Zoology (4013782-4)**
2. Credit hours: **4 credit hours.**
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

The present course is designed to the PhD program. The student will be selecting some topics that related to his PhD plan. The main goal of the course is to introduce numerous vertebrate disciplines.

This course integrates multiple biological disciplines (including vertebrate ecology, genetics, developmental biology, evolution, and physiology) to explore the biology and evolutionary history of vertebrates. We will survey the important theories and hypotheses about the biology of vertebrates and examine how these concepts were conceived and tested. Applied studies include field and/or lab studies include taxonomy, diversity, ecology, morphology anatomy of fish, amphibian, reptile, bird and mammal.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course will survey the important theories and hypotheses about the biology of vertebrates and examine how these concepts were conceived and tested. It study vertebrate morphology, taxonomy, physiology, and behavior of various vertebrate groups; comparative anatomy in relationship to the evolution of the vertebrates. Vertebrate diversity, classification, morphology, anatomy and life history: study vertebrate biology, Habitat and Habits, external features and measurements; and skin, skeleton, locomotion, nutrition, respiration, excretion, blood system, C.N.S. sense organs, reproduction; phylogenetic relations of chordate animals include the following representative chordate animals such as: Balanoglossus, Ascidia (tunicates, sea squirt or Ciona), Branchiostoma (Amphioxus), Petromyzon, Scoliodon a genus of requiem sharks in the family Carcharhinidae, Tilapia, Bufo, Agama (agamid lizard, Agamidae), Columba (Columbidae) and rabbit (Leporidae) or Rattus (Muridae) to illustrate the evolution, organization and diversity of Chordates. Practical applications include field studies include taxonomy, diversity, ecology, morphology anatomy of fish, amphibian, reptile, bird and mammal, in addition, lab studies include gross anatomy, microscopic anatomy of particular vertebrate animals.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Vertebrate diversity, ecology, taxonomy, morphology, anatomy (feeding, locomotion, respiration, excretion, blood systems, CNS, sense organs), physiology, behavior, in addition, molecular and phylogenetic relations of various vertebrate groups: The student select one of the following disciplines:		
I- Ichthiology: diversity, ecology, taxonomy, morphology, physiology, behavior and reproduction of Jaw-less fishes, chartilagenous or bony fish. (order, family, genus or species).		
II- Herpitology: diversity, ecology, taxonomy, morphology, physiology, behavior and reproduction of amphibians or reptiles. (order, family, genus or species).		
III- Ornithology: diversity, ecology, taxonomy, morphology, physiology, behavior and reproduction of Birds (order, family, genus or species).		
IV- Mammalogy: diversity, ecology, taxonomy, morphology, physiology, behavior and reproduction of mammals (order, family, genus or species).		
Practical exercises include one of the following:		
1- Lab studies and gross anatomy and microscopic anatomy of body organs in particular fish, amphibian, reptile, bird and mammal.		
2- Field study (behavior, habitat, feeding and reproductive behavior, nestling, offspring and parental care)		
Topics study major vertebrate transitions; Ecology and Morphology:		
V- The transition from jawless to jawed vertebrates (Jaws, Teeth and Feeding);		
VI- Biology, anatomy, physiology, reproduction and classification of Chondrichthyes;		

VII- Biology of Early Actinopterygians & Specializations of Teleosts, up to Specializations in Fins; Feeding Ecology, Morphology, anatomy and physiology, reproduction and classification;		
VIII- Biology, anatomy, physiology, reproduction and classification of Amphibians, Feeding Specializations of Plethodontid Salamanders, Newts and Anura;		
IX- Patterns of Amniotes Temporal Fenestration of the skull and Evolution of Jaws and Ears;		
X- Specialization for Feeding, Ecology and Morphology; Sensory Systems: Water, the Sensory organs and Prey Detection of Fishes;		
XI- Sensory Systems in Air, Sensing and Making Sense of the World: Eyes, Ears, Tongues, Noses , and Brains;		
XII- Environmental Physiology, Obtaining Oxygen in Water and Obtaining Oxygen from Air (Breathing Air), Cutaneous Respiration, Taking Advantage of the Opportunity for Sustained Locomotion, Increasing Gas Exchange: The Trachea and Lungs;		
XIII- osmoregulation (Exchange of Water), exchange Ions and gases; Getting Rid of Waste: The Kidneys and Bladder.		
XIV- Responses to Temperature: Endothermy and Ectothermy, Controlling Body Temperature in a Changing Environment, Taking Advantage of Wasted Energy: Endorthemry, Behavioral Control of Body Temperatures by Ectothermy, Endothermic Regulation;		
XV- Locomotion: Locomotion in Water, Origin of Fins, Specialization of the Fins, Support and Locomotion on Land up to Appendicular Skeleton, Taking Advantage of the Opportunity for Sustained Locomotion; The Second Evolution of Flight (Wings and Flight), The Structure of Birds;		
XVI- Reproduction: Actinopterygian Reproduction, Structure of the Amniotic Egg & Origin of the Amniotic Egg,		
XVII- Diversity of Life Histories of Amphibians, Social Behavior and Courtship, Parthenogenisis, Parental Care, Social Behavior, Mating Systems, Oviparity; Mammalian Reproduction: Some Extreme Placental Mammal Reproductive Specializations, Lactation, Placental Mammals Reproductively Superior to Marsupials, Life History Strategies, Sex Determination Temperature-Dependent Sex Determination and Sex Chromosomes;		
XVIII- Life History Strategies, Migration; Temperature Regulation and Body Size in Turtles, Navigation and Migration.		
Total	30	64

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

A- Study vertebrate disciplines includes: systematics, diversity, morphology, anatomy, zoographical, physiological and developmental

- **The student should be able to Classify vertebrate using morphological characteristics of each group together with physiological and behavioral characteristic into class, order, family and some common genus and species.**
- **Explain evolution of vertebrates in terms of anatomical comparative which is importance to their survivorship.**
- **Give common and scientific names of some vertebrates that are commonly found in KSA.**
- **Describe the solutions employed by different groups of vertebrates to shared environmental challenges (i.e., adaptations) and explain how these environmental challenges shaped vertebrate morphology and life history.**

- **Interpret phylogenies and describe the relationships between different vertebrate groups.**
- **Categorize vertebrates by their morphological novelties.**
- **Use vertebrate examples to explain ecological, physiological, developmental and evolutionary concepts.**
- **Justify how data from scientific studies on vertebrates supports relevant ecological, physiological, developmental, and evolutionary concepts.**

- **Practically: The student should be able to demonstrate perfect presentation about one of the following vertebrate classes:**
  - **Anatomy, morphology, systematics, and ecology of fish, Amphibian, reptile, bird or, mammal.**
  - **expect students to follow directions about the:**
    - **correct use and presentation of scientific names (and other terms);**
    - **about citing material, whether in the text or in the Literature Cited (at the end of essays or laboratory reports)**
    - **the presentation of course material.**

Also, students will be able to apply one of the following

B- General biology topics for consideration include phylogeny and development as well as the systems involved in support, locomotion, feeding, digestion, circulation, communication, osmoregulation, gaseous exchange, reproduction and sensory operations.

C- Vertebrate comparative anatomy and physiology: A comparative study of skeletal, muscular, integumental, nervous, circulatory, respiratory, digestive, reproductive systems including excretory and sense organs of vertebrates.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1			
1.2			
2.0	**Cognitive Skills**		
2.1			
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1			
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1			
4.2			
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	**Paper presentation (seminar)**		**30%**

2	**Short essay**		**20%**
3	**Short written exam**		**10%**
4	**Long literature review**		**40%**
5	**TOTAL**		**100%**

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.
Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:

- **Carroll, S.B. 2009. Into the Jungle. Great adventures in the search for evolution. Pearson Education, Inc, New York.**
- **Shubin, N. 2007. Your inner fish: a journey into the 2.5 billion-year history of the human body. Pantheon Books, New York.**
- **Hildebrand, M. and G. Goslow. 2001. Analysis of vertebrate structure, 5th edition. John Wiley & Sons Inc., New York, and Pough, F.H., C.M. Janis and J.B.**
- **Heiser. 2009. Vertebrate life, 8th edition. Benjamin Cummings, New York.**
- **Bond, C.E. 1996. Biology of Fishes. 2nd ed. Saunders College Publishing.**
- **Gill, Frank B. 1994. Ornitholog. 2nd ed. W.H. Freeman and Co., New York.**
- **Halliday T. and K. Adler, K., editors. 2002. The Firefly Encyelopedia of Reptiles and Amphibians. Firefly Books Ltd.**
- **Lekagul. B. and Mc Neely, J. 1977. Mammals of Thailand. Kurusapha, Bangkok.**
- **Lekagul, B. and Round, P.D. 1991. A Guide to the Birds of Thailand. Saha Karn Bhaet Co. Bangkok. Nowak, R. 1991. Walker's Mammals of the World Vol. I, II. Johns Hopkin University Press, Baltimore. Orr, R.T. 1955. Vertebrate Biology. 2nd ed. Saunders, Philadelphia, 483 pp.**
- **Robson, C.R. 2002. A Field Guide to the Birds of Thailand. New Holland, London.**
- **Vaughan, T.A. Ryan, J.M. and Czaplewski, N.J. 2000. Mammalogy. Thompson Learning Inc.**

2. List Essential References Materials (Journals, Reports, etc.)

(1)- Journal related to topics
(2)- sites related to topics

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

http://www.eksu.edu.ng/wp-content/uploads/2010/06/ZOOLOGY%20COURSE%20CONTENT%20SPECIFICATIONS.pdf
http://myweb.fiu.edu/wp-content/uploads/sites/335/2017/08/Vertebrate-Zoology-Syllabus-2017.pdf
http://www.muic.mahidol.ac.th/courses/syllabi_2006/ICBI322.pdf
https://www.uwo.ca/biology/pdf/undergraduate/Bio2471BOutline.pdf
https://www.uwo.ca/biology/pdf/undergraduate/Bio2471BOutline.pdf

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.
(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching **(1)- Questionnaires / students opinion survey** **(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting**
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department **1)- Revision of student answer papers / assignments by another staff member.** **(2)- Analysis the grades of students.**
3. Procedures for Teaching Development **(1)- Preparing the course as PPT.** **(2)- Using scientific youtubes.** **(3)- Coupling the theoretical part with laboratory part** **(4)- Periodical revision of course content.**
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: _____

COURSE SPECIFICATIONS

Form

Course Title: Emerging Topics in Embryology

Course Code: 4013783-4

Prof. Dr. Osama Mohamed Sarhan

Institution: **Umm Al-Qura University** Date:

College/Department: **Faculty of Applied Science / Department of Biology**

A. Course Identification and General Information

1. Course title and code: **Emerging Topics in Embryology (4013783-4)**
2. Credit hours: **4 Credit hours**
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
PhD program in Zoology
4. Name of faculty member responsible for the course: **Prof. Dr. Osama Mohamed Sarhan**
5. Level/year at which this course is offered:
6. Pre-requisites for this course (if any):
7. Co-requisites for this course (if any):
8. Location if not on main campus: **Abdia and Alazahir campus**
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	✓	percentage?	**100 %**
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other		percentage?	

Comments:

B Objectives

1. The main objective of this course

The present course is designed for PhD program. It includes numerous topics to cover different subjects in vertebrate embryology. PhD student select specific topic is selected in consultation with the course coordinator. The main goal of the course is to understand:

The main aim of the course is to expand the knowledge of morphological development of organs and deepen them on study of embryonic developmental mechanisms; cell specification and differentiation; embryonic axis formation; morphogenesis; intercellular signaling; gametes and infertility, oogenesis, spermatogenesis, or abnormal gametes; transport of gametes and fertilization; cleavage and implantation; origin; growth; developmental mechanisms gastrulation; Basic embryonic body plan. Development of embryonic germ layers; organogenesis and embryonic membranes; limb formation, regeneration and dysmorphogenesis; evolutionary developmental biology; comparative embryology or; relevance of embryology and teratology; teratological agents. The lab component will incorporate either descriptive or experimental embryological techniques.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course is designed for PhD program to study some topics according the student PhD plan. The main emerging topics include: morphological development of organs and deepen them on study of developmental mechanisms; cell specification and differentiation; embryonic axis formation; morphogenesis; intercellular signaling; gametes and infertility, oogenesis, spermatogenesis, or abnormal gametes; transport of gametes and fertilization; cleavage and implantation; origin; growth; developmental mechanisms gastrulation; basic embryonic body plan. Development of

ectodermal, mesodermal and endodermal germ layers; embryonic membranes; Umbilical cord; development of placenta; the morphological aspects of organismal development of particular vertebrate embryo; classic descriptive embryology, developmental events of specific body system (cardiovascular, digestive, respiratory and urogenital, nervous systems (central and peripherial nervous system, development of the ears and eyes), integumentary; musculoskeletal, and limbs system or limbs; regeneration; evolutionary developmental biology; comparative embryology or dysmorphogenesis; relevance of embryology and teratology; teratological agents. The lab component will incorporate either descriptive or experimental embryological techniques.

1. Topics to be Covered

List of emerging topics	No. of Weeks	Contact hours
Introduction to advanced embryology; gametogenesis and abnormal gametes		
Role of genes during embryonic development I: signaling pathways and intercellular communication during development; hematopoiesis and fate of stem cells;		
Role of genes during embryonic development II: developmental genetics in vertebrates fertilization, gastrulation, neurulation, cell migration; mesoderm formation and somite differentiation; migration of neural crest cells and following their fate; differentiation of neural tube and disruptions of their closing.		
Transport of gametes and fertilization; Gametes and infertility, oogenesis, spermatogenesis, or abnormal gametes; transport of gametes and fertilization; Cleavage and implantation; cleavage and implantation; Gastrulation; origin; growth; developmental mechanisms during gastrulation.		
Basic embryonic body plan; Development of ectodermal, mesodermal and endodermal germ layers; embryonic membranes; Development of placenta and umbilical cord.		
Cell specification and differentiation; embryonic axis formation; morphogenesis; intercellular signaling		
Development of the cardiovascular; digestive; respiratory; urogenital; nervous; integumentary; or musculoskeletal systems.		
Late embryogenesis I: formation of head and jaw; pharyngeal arches development; disruption of facial prominences development.		
Late embryogenesis II: teeth development; epithelial-mesenchymal induction; dyssignaling during odontogenesis and their contribution to defects of tooth formation;		
Late embryogenesis III: limb formation, induction of limb buds (molecular models of forelimb and hindlimb formation, disruptions of finger formation).		
Late embryogenesis IV: Limbs; regeneration; evolutionary developmental biology; comparative embryology or dysmorphogenesis; relevance of embryology and teratology; teratological agents.		
The lab component will incorporate either descriptive or experimental embryological techniques.		
Presentation		
Total	**30**	**64**

2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other	Total
Contact Hours	30					30
Credit	4					64

3. Individual study/learning hours expected for students per week.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies:

On completion of this course students will be able to:

- Demonstrate an understanding of the process of gamete production and fertilization
- Trace the period of development from zygote to blastocyst formation
- Identify and define the major stages in the development of model organisms
- Understand the derivation of the cytotrophoblast and syncytiotrophoblast
- Know the origins of the epiblast and hypoblast

- **Understand the steps involved in cleavage and gastrulation and also identify the types of cell movements involved in gastrulation**
- **Know the origins of the amniotic and yolk sac cavities**
- **Understand the importance of extraembryonic mesoderm in forming the chorionic cavity**
- **Describe primary villus formation in the placenta and the role of the cytotrophoblast and syncytiotrophoblast**
- **Define the term ectopic pregnancy and know where this phenomenon usually occurs**
- **Describe the process of gastrulation and distinguish it from the process of neurulation**
- **Name the 3 germ layers and describe their origins**
- **What is the organizer and what does it organize**
- **Outline the processes involved in generating a nervous system**
- **Outline the process involved in limb development**
- **Describe the organogenesis of cardiovascular, digestive, respiratory and urogenital, nervous systems (central and peripherial nervous system, development of the ears and eyes), integumentary; musculoskeletal, and limbs system or limbs.**
- **Detect dysmorphogenesis**
- **Carry out simple experiments using**
- **Write information clearly in weekly reports**
- **Visit libraries and make notes of the upcoming lectures.**
- **Work effectively as an individual or part of a team**
- **Use scientific resources to collect the information.**
- **Be able to analyses data and compare it with other studies.**
- **Demonstrate effective communication skills in the form of student led group presentations.**
- **Demonstrate skills in working effectively with others as a member of a team.**

On the table below are the five NQF Learning Domains, numbered in the left column.
First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1			
1.2			
2.0	**Cognitive Skills**		
2.1			
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1			
3.2			
4.0	**Communication, Information Technology, Numerical**		
4.1			
4.2			
5.0	**Psychomotor(if any)**		
5.1			
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	**Paper presentation (seminar)**		**30%**
2	**Short essay**		**20%**

3	**Short written exam**		**10%**
4	**Long literature review**		**40%**
5	**TOTAL**		**100%**

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

Academic teaching staff will be available to meet individual students for consultation and academic advice at their private offices at the times advised.

Office hours: 10 hrs per week; each semester. Time will varies each semester based on academic schedule for each teaching staff.

E Learning Resources

1. List Required Textbooks

Recent text books:

- **Gilbert and Barresi, Developmental Biology, 11th edition**
- **Human Embryology and Developmental Biology, by Bruce M. Carlson.**
- **Langman's Medical Embryology, 11th Ed. LWW Ronan O'Rahilli &Fabula Muller,(2015) Human Embriology and Teratology,3rd Ed. ISBN-13: 978-0471382256, ISBN-10: 0471382256**
- **Ernest Hodgson (2004), Teratogenesis, Published Online**
- **Moore, K.L., Persaud, T.V.N. & Torchia, M.G. (2015). The Developing Human: Clinically Oriented Embryology(10th ed.), Philadelphia: Saunders. UNSW Library | NLM ID: 101649439**
- **Schoenwolf G., Bleyl S., Brauer P., Francis-West P. Larsen's Human Embryology. ELSEVIER, 2014; 5th edition**

2. List Essential References Materials (Journals, Reports, etc.)

(1)- Journal related to the topics

(2)- Sites related to the topics

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

http://www.ucdenver.edu/academics/colleges/medicalschool/departments/CellDevelopmentalBiology/MSMHA/Documents/ANAT%206330%20Fall%202013%20Syllabus.pdf
https://fvl.vfu.cz/information-about-faculty/sections-departments/anatomy-histology/pedagogical-activity/experimental-embryology/index.html
http://www.eksu.edu.ng/wp-content/uploads/2010/06/ZOOLOGY%20COURSE%20CONTENT%20SPECIFICATIONS.pdf
https://www.etsu.edu/com/studentsvcs/incomingstudents/embryology-syllabus-handout.pdf
http://www.wiu.edu/cas/biological_sciences/syllabi/2014_fall/ZOOL320LIVINGSTON.pdf
https://www.wl.cm.umk.pl/panel/wp-content/uploads/Embryology-2nd-year.pdf
http://www.tamuc.edu/academics/cvSyllabi/syllabi/201680/81126.pdf
http://www.mbl.edu/education/courses/embryology/

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

(1)- Class room is already provided with data show

2. Technology resources (AV, data show, Smart Board, software, etc.)

(1)- Class rooms are equipped with data show.

(2)- A computer lab is required and connected to the network for students to gather their data and study materials

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

(1)- Questionnaires / students opinion survey

(2)- Open discussion in the class room at the end of the lectures or during individual student/staff meeting

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department **1)- Revision of student answer papers / assignments by another staff member.** **(2)- Analysis the grades of students.**
3. Procedures for Teaching Development **(1)- Preparing the course as PPT.** **(2)- Using scientific youtubes.** **(3)- Coupling the theoretical part with laboratory part** **(4)- Periodical revision of course content.**
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

Name of Course Instructor: _____

Signature: _____ Date Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: _____