



Course Specifications

Course Title:	Vertebrates
Course Code:	4012322-3
Program:	General Biology
Department:	Department of biology
College:	Faculty of Applied Science
Institution:	Um Al-Qura University

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A. Course Identification

1. Credit hours: 3 hours.
2. Course type a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/> b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 2nd Year / Level 4.
4. Pre-requisites for this course (if any): Invertebrates (4012311-3).
5. Co-requisites for this course (if any): NA.

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	50
2	Blended	-	-
3	E-learning	-	-
4	Correspondence	-	-
5	Other	30	50

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	30
2	Laboratory/Studio	42
3	Tutorial	-
4	Others (specify)	30
	Total	102
Other Learning Hours*		
1	Study	30
2	Assignments	8
3	Library	15
4	Projects/Research Essays/Theses	10
5	Others (specify) 2 Field trips	-
	Total	63

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>The course covers a detailed study of vertebrate animals, their taxonomy, morphology and anatomy. The course follows up the evolution of morphological and anatomical features of body organs in protochordates and vertebrate classes. The course also describes different types of structural adaptation which are developed in the different body systems or organs as modes of adaption with the changes in the surrounding environment. Study samples were taken for each taxon as a model of study.</p>
<p>2. Course Main Objective</p> <ul style="list-style-type: none"> The course gives a clear idea about the evolution of anatomical and organo-systems of Amphioxus features of the different classes of chordates especially vertebrate animals including fishes and tetrapods that are the matter of study in this course.

The course also focuses or contrasts on understanding the extent of development in the organs and body systems by transition from sect to sect.

- By the end of the course, the student should:
- Learn the importance of recognizing taxonomic status of the living organism to distinguish it and facilitate their study.
- Compare between specific characters of chordates classes using their representative examples.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	Identify and summarize the morphological and anatomical features and basis of chordate classification.	
1.2	Know how to examine and describe representative species for chordate subphyla; such as Cephalochordata, Urochordata, Hemichordata, and Vertebrata.	
1.3	Learn basis of chordate reproduction, and basis of chordate development.	
1.4	Understand the economic hazards or beneficial importance of Chordata.	
1.5	Draw and describe adult and larvae and anatomy of selected chordate samples, as well as, the life cycle of selected species.	
1.6	Chordate classification and general characters of chordate classed	
1.7	Specific Characters, morphology and internal anatomy of representative species of different classes of phylum Chordata.	
1.9	Discuss the habitat, Biology and life cycle of the selected species	
2	Skills:	
2.1	Summarize the special characters of chordate subphyla and apply them form scientific classification.	
2.2	Categorize and classify the chordate species according to their specific characters. Then define the scientific name of chordate samples.	
2.3	Differentiate between adult and larval stages of invertebrate samples.	
3	Competence:	
3.1	Developing oral presentations and leader ship activity	
3.2	Communicating personal ideas and thoughts	
3.3	Work independently, Self-learning and as part of a team,	
3.4	To examine, describe, draw, dissect or contribute reports.	

C. Course Content

No	List of Topics (16 weeks)	Contact Hours
1	Classification, general characters, anatomical features and of phylum Chordata.	2
2	General characters, morphology and anatomy of protochordates, cephalochordates, urochordates and hemichordates	2
3	Specific characters, morphology and anatomy of subphylum vertebrata, including agnatha, gnatha.	2
4	Study class Cyclostomes, morphology, anatomy, biology and reproduction of Lamprey and hagfish.	2

5	Class Chondrichthyes: classification, characters, morphology, anatomy, biology and reproduction of shark or dogfish	2
6	Midterm exam	2
7	Class Actinopterygii: classification, characters, morphology, anatomy, biology and reproduction of bony fish.	2
8	Class Amphibia: classification, characters, morphology, anatomy, biology and reproduction of amphibians. Study representative example from order Anura, toad, frogs, or hyla.	2
9	Study the specific characters, embryonic membranes of anamniotes and amniotes.	2
10	Class Reptilia: classification, characters, morphology, anatomy, biology and reproduction of class Reptilia. Study representative example from order Squamata, selected Lizard.	2
11	Class Reptilia: Study representative example from order Squamata, selected Lizard.	2
12	Class Aves: classification, characters, morphology, anatomy, biology and reproduction of birds. Avian classifications	2
13	Class Aves: Morphology and Anatomy of representative example from order Columbiformes, example: Pigeon.	2
14	Class Mammalia: classification, characters, morphology, anatomy, biology and reproduction of class Mammalia. Study representative example from order Lagomorpha, example: Rabbit.	2
15	Revision	2
16	Final exam	
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge		
1.1	Identify and summarize the morphological and anatomical features and basis of chordate classification.		
1.2	Know how to examine and describe representative species for chordate subphyla; such as Cephalochordata, Urochordata, Hemichordata, and Vertebrata.		
1.3	Learn basis of chordate reproduction, and basis of chordate development.		
1.4	Understand the economic hazards or beneficial importance of Chordata.		
1.5	Draw and describe adult and larvae and anatomy of selected chordate samples, as well as, the life cycle of selected species.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.6	Chordate classification and general characters of chordate classed		
1.7	Specific Characters, morphology and internal anatomy of representative species of different classes of phylum Chordata.		
1.8	Study habitat, biology and life cycle of the selected species.		
2.0	Skills		
2.1	Summarize the special characters of chordate subphyla and apply them for scientific classification.		
2.2	Describe the morphological and anatomical structure of selected representative chordate species.		
2.3	Define the scientific name of invertebrate samples and write their taxonomy.		
2.4	Apply practical activities to define and identify un-known samples.		
3.0	Competence		
3.1	Personal leadership activity	Follow up, correction, reorientation of their work. Discussion	Evaluation, oral exam, Written exam
3.2	Teamwork activity		
...	Reports and presentations		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodical Exam(s)	4	10 %
2	Mid Term Exam (Theoretic)	8	20 %
3	Mid Term Exam (practical)	9	10 %
4	Reports and essay	11	5 %
5	Final Practical Exam	15	15 %
6	Final Exam	16	40 %
	Total		100 %

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice: **2 Office hours/week**

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Mohammad Hassan Hamoud , Biology of vertebrates (2005), first Arabic edition, to be eligible for publication and distribution, Jordan.
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	<p>Abdel Raouf Gamal and Hassan Shehata (2003). Chordata, first edition, Publishing House, Riyadh, 2003.</p> <p>Mohamed Ismail Mohamed and others (2002). Fundamentals of Zoology, First Edition, Dar Al-Arab Thought, Cairo.</p> <p>Animal General, vertebrate and invertebrate: Zahid, Nabil Zaki, and Khaled Bakr Kamal, Al-Shegri Store book, 1426.</p> <p>Mahmoud Albanhawi, and others (2006). Text book of Zoology, tenth edition, Dar -Almaref, Egypt.</p>
Essential References Materials	<p>Leonard B. Radinsky (1987). The Evolution of Vertebrate Design 1st Edition. University of Chicago Press.</p> <p>Noriyuki Satoh (2016). Chordate Origins and Evolution: The Molecular Evolutionary Road to Vertebrates 1st Edition, Academic Press.</p>
Electronic Materials	<p>https://en.wikipedia.org/wiki/Chordate</p> <p>http://www.ucmp.berkeley.edu/chordata/chordata.html</p> <p>http://faculty.collegeprep.org/~bernie/sciproject/project/Kingdoms/Animal%20Kingdom%20-%205/Local%20copy/classification/chordata.html</p> <p>https://peda.net/kenya/css/subjects/biology/form-three/classification-ii2/kingdom-animalia/phylum-chordata</p>
Other Learning Materials	<p>CD prepared by the staff members containing U-tube videos.</p> <p>Biological charts, field trips</p>

2. Facilities Required

Item	Resources
<p>Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)</p>	<p>The areas of class rooms are suitable, concerning the number of enrolled students; and air conditioned.</p>
<p>Technology Resources (AV, data show, Smart Board, software, etc.)</p>	<p>Class rooms are already provided with data show, audio-visual equipment.</p>
<p>Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)</p>	<p>Models of dissected invertebrate animals.</p> <p>Microscopic slides.</p> <p>Light microscopes.</p>

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
<p>Student Feedback on Effectiveness of Teaching</p>	<p>Students.</p>	<p>Class room discussions.</p> <p>Questionnaires.</p>
<p>Evaluation of Teaching</p>	<p>Instructor or by the Department</p>	<p>Revision of student answer paper by another staff member.</p> <p>Analysis the grades of students.</p>

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Prof. Osama Mohamed Sarhan	
Reference No.		
Date	21/11/2019	