Course Specifications

Course Title:	**Invertebrates**
Course Code:	**4012311-3**
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	☐	College	☐	Department	☑	Others	☐
b.	Required	☑	Elective	☐				

3. Level/year at which this course is offered: **2nd Year / Level 3.**

4. Pre-requisites for this course (if any)**: General Biology (4011101-4).**

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

1. Course Description

Invertebrate's course is dealing with taxonomy of invertebrate phyla. It gives the general and specific characters of different phyla. Also, study morphology, anatomy and biology of selected species that representing those phyla.

2. Course Main Objective

1. List the general characters of the main phyla (protozoa, Porifera, Cnidaria, Platyhelminthes, Nematoda, Annelida, Arthropoda, Mollusca and Echinodermata.
2. Identify the main types of invertebrates upon their morphological variations.
3. Illustrate the biology and life cycles of selected examples of invertebrates.
4. Define the phylogenetic relations among the different invertebrates.
5. Understand the economic and medical importance of all invertebrates' phyla.

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 and classify invertebrate phyla.
- Describe and illustrate the internal anatomy of representative animals of different phyla.
- Apply microscopic examination for microscopic invertebrate specimens.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Identify and summarize the basis of animal classification, general characters of invertebrate phyla.	
1.2	Know the morphology, internal anatomy and biology of representative species of invertebrate classes; such as protozoa, Parazoa, diploblastic and triploblastic animals, coelomates, pseudo-coelomates and coelomates.	
1.3	Learn basis of sexual and asexual reproduction, direct and indirect Parazoan and metazoan development of invertebrate phyla.	
1.4	Understand the economic hazards or beneficial importance of invertebrates.	
1.5	Draw and describe adult and larvae and anatomy of invertebrate samples, as well as, the life cycle of selected invertebrate species.	
2	**Skills:**	
2.1	Summarize the special characters of invertebrate phyla and apply them form scientific classification.	
2.2	Categorize and classify the invertebrates according to number of embryonic layers (diploblastic and triploblastic groups); or coelom (Acoelomata, Pseudocoelomata, and true coelomata).	
2.3	Define the scientific name of invertebrate samples and write their taxonomy.	
2.4	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...	To examine, describe, draw, dissect or contribute reports.	

C. Course Content

No	List of Topics (16 weeks)	Contact Hours
1	Basis of animal classification, general characters of invertebrate phyla.	2
2	Subkingdom Protozoa, Protozoan Phyla: Sarcomastigophora; Ciliophora; Apicomplexa.	2
3	Subkingdom Parazoa, Phylum Porifera, examples: Asconoid, Synconoid and Leuconoid sponges; asexual & sexual reproduction.	2
4	Subkingdom Eumetazoa; Diploblastica; Phylum Cnidaria; Classes Hydrozoa; Scyphozoa; Cubozoa; Anthozoa (Corals).	2

5	**Subkingdom Eumetazoa; Triploblastica; Protostomia; Acoelomata; Phylum Platyhelminthes; Classes Turbellaria; Monogenea; Trematoda; Cestoda.**	**2**
6	**Midterm exam**	**2**
7	**Triploblastica; Protostomia; Pseudocoelomata; Phylum Nematoda; Class Secernentea, Ascaris.**	**2**
8	**Triploblastica; Protostomia; Coelomata; Phylum Annelida; Classes Secernentea, Ascaris.**	**2**
9	**Protostomia; Coelomata; Phylum Arthropoda; Subphylum: Hexapoda (class Insects "locust"); Subphylum: Crustacea (class Malacostraca "crabs, lobsters").**	**2**
10	**Phylum Arthropoda; Subphylum: Chelicerata (class Arachnida);**	**2**
11	**Subphylum: Myriapoda (class Chilopoda "Centipeds" & class Diplopoda "Millipedes").**	**2**
12	**Protostomia; Coelomata; Phylum Mollusca; Classes: Bivalvia (Mussels); Gastropoda (Snails & slugs); Cephalopoda (Squids, Octopuses).**	**2**
13	**Protostomia; Coelomata; Phylum Mollusca: Cephalopoda (Squids, Octopuses).**	**2**
14	**Deuterostomia; Coelomata; Phylum Echinodermata; Classes: Asteroidea (sea stars); Ophiuroidea (brittle stars); Holothuroidea (sea cucumber); Crinoidea (Sea lilies & sea feathers).**	**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 basis of animal classification, general characters of invertebrate phyla.**	**Study the structure and function of the thalamus, pituitary, thyroid parathyroid, adrenal gonads and pancreatic Islets. Lectures and student research papers; visual display "PowerPoint"; Homework assignments; Discussions; Handout of lecture notes**	**Homework; Quizzes; oral, presentation evaluation, sheet, discussion, midterm and final exams.**
1.2	**Know the morphology, internal anatomy and biology of representative species of invertebrate classes; such as protozoa, Parazoa, diploblastic and triploblastic animals, coelomates, pseudo-coelomates and coelomates.**		
1.3	**Learn basis of sexual and asexual reproduction, direct and indirect Parazoan and metazoan development of invertebrate phyla.**		
1.4	**Understand the economic hazards or beneficial importance of invertebrates.**		
1.5	**Draw and describe adult and larvae and anatomy on invertebrate samples, as well as, the life cycle of selected invertebrate species.**		
2.0	**Skills**		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.1	**Summarize** the special characters of invertebrate phyla and **apply** them form scientific classification.	1. **Interactive lectures.** 2. **Seminars.** 3. **Participation of students in discussions during the lecture.** 4. **Trying to explain the issues in regular and motivated manner.** **Follow up the students in lab and during carryout all analytical techniques.**	- **Exam must contain questions that can measure these skills.** - **Quiz and exams.** - **Discussions after the lecture.** **Practical exam.**
2.2	**Categorize** and **classify** the invertebrates according to number of embryonic layers (diploblastic and triploblastic groups); or coelom (Acoelomata, Pseudocoelomata, and true coelomata).		
2.3	**Define** the scientific name of invertebrate samples and write their taxonomy.		
2.4	**Differentiate** between adult and larval stages of invertebrate samples.		
2.5	**Submit individual and team reports**		
2.6	**Explain** different lifecycle of studied animals		
2.7	**Practical** activities, dissection and microscopic examination.		
3.0	**Competence**		
3.1	**Personal leader ship activity**		
3.2	**Teamwork activity**		
…	**Reports and seminars**		

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	Invertebrates (2016). Richard C. Brusca and Wendy Moore, ISBN-13: 978-1605353753.
Essential References Materials	Modern Text Book of Zoology: Invertebrates (2008). Prof. R. L. Kotpal. Rastogi Publications, 2012 – ٨٨٣pp. A Textbook of Invertebrates (2012). H.S. Bhamrah , Kavita Juneja, Sara, S. Publishing.

	A Text book of Invertebrates (2010). N C Nair , N Arumugam , N Soundarapandian, T Murugan S leelavathy, Sara, S. Publishing. Microscopic slides, preserved specimens, dissected models
Electronic Materials	https://en.wikipedia.org/wiki/Invertebrate Internet, YouTube video
Other Learning Materials	CD prepared by the staff members containing U-tube videos. Biological charts, field trips

2. Facilities Required

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

G. Course Quality Evaluation

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

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; Dr. Loay Alkzmi
Reference No.	
Date	21/11/2019