Course Specifications

Course Title:	**Entomology**
Course Code:	**4013362-3**
Program:	**General Biology**
Department:	**Department of biology**
College:	**Faculty of Applied Science**
Institution:	**Um Al-Qura University**

Table of Contents

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:	**3rd Year / Level 6.**
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)	-
	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

Entomology is the study of insects. Insects are involved with virtually every part of our lives; they are pests that eat our food, our houses, our animals, and are vectors that spread sickness and disease. But insects aren't all bad! Many insects are beneficial pollinators, decomposers of dead materials, and useful in the biocontrol of unwanted pests. Entomologists study insects to help us manage pests, or learn how to better use them to our advantage. The course "general entomology" is designed for the students to understand insects and the human – insect relationship concepts. the basic morphological and anatomical characteristic of insects including the integument and its components, the different tagmata of insect body and their appendages, the internal anatomy, the history of insect taxonomy and the bases of modern taxonomy.

2. Course Main Objective

After completing this course, students should be able to:

- **After completing this course student should be able to:**
- **Understand the principles of the human – insect relationship.**
- **Demonstrate the link the basic morphological characteristic of insects including the integument and its components, the different tegmata of insect body and their appendages.**
- **Describe the structure and function of various organs.**
- **Demonstrate the internal anatomy of insects.**
- **Understanding the history of insect taxonomy and the bases of modern taxonomy.**
- **List all the insects' orders.**
- **Recognize some important insect-related diseases.**
- **Recognize and design models of insect life cycle.**
- **Compare and assess the concepts and principles behind scientific theories regarding the significance of the specific structure in the insect body.**
- **Apply field and practical applications.**

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	**Identify the terminology and nomenclature of insect, morphology and their body plan.**	
1.2	**Know the insect - human relation-ships.**	
1.3	**Learn basis of insect taxonomy, anatomy, biology, reproduction and their economic importance.**	
1.4	**Understand the insect morphology, body tagmata; the antennae, thoracic and abdominal appendages.**	
1.5	**Assimilate and Recognize the internal anatomy of insects: integument and hypodermis; digestive; circulatory; respiratory; excretory; nervous and reproductive systems**	
1.6	**Realize and draw the life cycle representative species for different orders and families.**	
1.7	**Acquire and list of insects with beneficial, vectors, pests or biological control species.**	

CLOs		Aligned PLOs
1.8	Apply the microscopic examination to selected microscopic species and their mouth parts, wings and appendages.	
2	Skills:	
2.1	Summarize the morphological, anatomical and biological characteristics of representative species.	
2.2	Categorize the life cycles of beneficial, parasitic, pest species.	
2.3	Relate and realize the human- insect relationships.	
2.4	Submit individual or team reports	
2.5	Précis the specific histological structure of body organs.	
2.6	Differentiate between insect stages.	
2.7	Dealing with and apply practical and microscopic applications.	
2.8	Field activities, sample collection, sorting, classify and photograph them, then prepare student teams presentation	
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	The insect - human relationship: beneficial; neutral and harmful relationship.	2
2	The integument and its components: cuticle; cuticular appendages and process; Tanning or sclerotization; hypodermis; tentorium and pore canals.	2
3	The different tagmata of insect body: head; mouthparts; antenna and tentorium.	2
4	The mouth–parts structure (Labrum – mandibles – maxillae – labium – hypopharynx – the preoral cavity). Types and modifications of mouth-parts.	2
5	The insect thorax: segments (prothorax – mesothorax – metathorax); thoracic sclerites and endoskeleton.	2
6	The thoracic appendages: structure of leg (Coxa – trochanter – femur – tibia – tarsus – pretarsus); modifications. Wings: structures, venation, regions, basal articulation of wings and the wing as coupling apparatus	2
7	The abdomen and its appendages: structure; segments; endoskeleton; abdominal appendages; reproductive and nonreproductive appendages; structure of ovipositor; sting apparatus and male genitalia.	2
8	The internal anatomy: 1- The digestive system: structure; histology; and functions of salivary glands, foregut (the preoral cavity –pharynx – esophagus- proventriculus and the cardiac valves), midgut (peritrophic membrane, gastric caeca) and	2

	hind gut (pyloric valves – intestine – rectum and rectal glands- anal glands); in addition, nutrition and digestion.	
9	2- The circulatory system "open type": dorsal vessels; diaphragm; sinuses; pulsatory organ; hemolymph; circulation and types of hemocytes.	2
10	3- The excretory system: Malpighian tubules numbers and structure; attachment types of Malpighian tubules with hind gut; pericardial cells and nephrocytes and fat bodies.	2
11	4- The respiratory system: trachea and tracheoles; spiracles; types of respiratory systems (the holopneustic, the hemipneustic, and the apneustic); air sacs; the respiratory gills (tracheal gill – spiracular gill – blood gill) and the integument as respiratory organ; respiration of endoparasitic insects.	2
12	5- The nervous system "NS": the central NS (brain, suboesophageal ganglion and ventral nerve cord); the visceral NS (stomatogastric sympathetic NS, ventral and caudal sympathetic); and the peripheral nervous system.	2
13	6- The reproductive system: Types of reproduction; male reproductive system (testes, vas deferens, ejaculatory ducts and male accessory glands).	2
14	The reproductive system: The female reproductive system. The ecdysis and metamorphosis	2
15	General revision	
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 the terminology and nomenclature of insect, morphology and their body plan.	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 insect - human relation-ships.		
1.3	Learn basis of insect taxonomy, anatomy, biology, reproduction and their economic importance.		
1.4	Understand the insect morphology, body tagmata; the antennae, thoracic and abdominal appendages.		
1.5	Assimilate and Recognize the internal anatomy of insects: integument and hypodermis; digestive; circulatory; respiratory; excretory; nervous and reproductive systems		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.6	Realize and draw the life cycle representative species for different orders and families.		
1.7	Acquire and list of insects with beneficial, vectors, pests or biological control species.		
1.8	Apply the microscopic examination to selected microscopic species and their mouth parts, wings and appendages.		
2.0	**Skills**		
2.1	Summarize the relationships between insects and human health and economic importance.	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 tabulate the morphological and anatomical characterization to design simple key for modern insect classification.		
2.3	Apply lab applications. Submit individual or team reports		
2.4	Develop skills for identification, drawing and summarize general characters of orders and families.		
2.5	Dealing with insect collection, sorting and report them as presentation.		
2.6	Differentiate between adult and larval stages.		
2.7	Précis the anatomical and histological structure of body organs		
2.8			
3.0	**Competence**		
3.1	Personal leader ship activity	Follow up, correction, reorientation of their work. Discussion	Evaluation, oral exam, written exam
3.2	Self-learning in teamwork.		
…	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 %
7			

***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	**O.W. Richard & R.G. Davies, 1977. IMMS' General textbook of Entomology. Part I & II. (Chapman & Hall, London). 1354 pages.** **H.E. Evans, 1984. Insect biology – A textbook of Entomology. (Addison-Wesley Publ. Co.). 436 pages.** **R.M. Fox & J.W. Fox, 1964. Introduction to comparative entomology. (Reinhold Publ. Corp., NY). 450 pages.** **M.S. Mani, 1982. General entomology. (Oxford & IBH Publ. Co.). 912 pages.** **M.S. Mani, 1995. Insects. (National Book Trust, India). 162 pages.** **H.H. Ross, C.A. Ross & J.R.P. Ross, 1982. A textbook of entomology. (John Wiley & Sons). 666 pages + index.** **J.E.Webb, J.A. Wallwork & J.H. Elgood, 1981. Guide to invertebrate animals. (English language book society & McMillan). 305 pages.** **S.C. Saxena, 1992. Biology of insects. (Oxform & IBH Publ. Co. Pvt. Ltd.). 366 pages.** **Staff lecture notes**
Essential References Materials	**R.A. Arnett & R.L. Jacques, 1985. Insect life: A field entomological manual for the amateur naturalist (Prentice-Hall, Inc.). 354 pages.** **D.B. Tembhare, 1997. Modern entomology. (Himalaya Publ. House). 623 pages.** **P.J. Gullan & P.S. Cranston, 2000. The insects: An outline of Entomology. (Blackwell Science, USA).**
Electronic Materials	**Scientific search engines on the internet.**
Other Learning Materials	**CD prepared by the staff members containing U-tube videos.** **Multi- media associated with the text book and the relevant websites.** **Biological charts.**

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.** **Lecture room equipped with a black board and Data show. Instructors use their own laptop.** **Ecology lab well equipped.**

Item	Resources
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)	**Laboratory instruments for measuring some ecological parameters.**

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 Bahareth; Prof. Osama Mohamed Sarhan**	
Reference No.		
Date	**21/11/2019**	