Course Specifications

Course Title:	**Pest control**
Course Code:	**4014331-2**
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:	**2 hours.**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**4th Year / Level 7.**
4. Pre-requisites for this course (if any)**:**	**Entomology (4013362-3).**
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	-
3	Tutorial	-
4	Others (specify)	30
	Total	60
Other Learning Hours*		
1	Study	30
2	Assignments	8
3	Library	10
4	Projects/Research Essays/Theses	10
5	Others (specify)	-
	Total	58

* 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

Civilization has been combating insects and other pests throughout history. A pest is an undesirable organism that injures humans, desirable plants and animals, manufactured products, or natural substances. Many insects compete for our crops and livestock. As the battle between humans and pests continues over time, so will innovative methods of control.
Pest control is designed for the students to understand the definition of pest and reasons for its deployments. The harmful effects of pests on plants, crops, and stored grain. Also, it will be covered different strategies used to control the pest. The factors that turn normal insects into pests. The role of ecosystem in controlling pests and overview of environmental friendly pesticides and its benefits.

2. Course Main Objective

After completing this course, students should be able to:

- **Understand the principles of the human – insect relationship.**
- **List all the insects' orders.**
- **Recognize some important insect-plant related diseases**
- **Study the definition of pest and reasons for its deployments.**
- **Study history and principles of insect control.**
- **Study different strategies used in pest control.**
- **Integrated pest management program (IPM).**
- **Study the introduction of pesticides and their modes of action.**
- **Recognize the role of ecosystem in controlling pests.**

Knowledge of environmentally and friendly pesticides and its benefits

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	**Identify the different types of pests.**	
1.2	**Define the major concepts in field of pest control and pesticides toxicology. As well as the major applications of pest control and pesticides toxicology in solving biological and environmental problems.**	
1.3	**Apprehend the basic information and techniques related to pest control and pesticides toxic.**	
1.4	**Illustrate the role of ecosystem in controlling pests.**	
1.5	**Summarize the working knowledge of the environmentally and friendly pesticides and its economic benefits.**	
2	**Skills:**	
2.1	**Summarize and list of representative pests or vector species and distinguish their human-health relationships.**	
2.2	**Categorize the life cycles of parasitic, pest species. Then summarize methods of pest and biological control.**	
2.3	**Submit individual or team reports**	
2.4	**Précis the specific sexual behavior of pests to resist their eggs, hatched larvae and determine methods of biological control.**	
2.5	**Differentiate between insect stages.**	
2.6	**Dealing with and apply practical and microscopic applications.**	
2.7	**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 definition of pest and reasons for its deployments.**	**2**

	What is the pest, and antiquity of pest problems. What turned insects into pests, and what causes pest outbreaks?	
2	Recognize the role of ecosystem in controlling pests. Climatic factors, natural barriers, natural enemies, and diseases	2
3	Different strategies used in pest control: the history; inorganic and organic insecticides; chemical control and its hazards.	2
4	Mode of action of insecticides, and metabolism of insecticides. Resistance and advantages of insecticides. Hazards of insecticides and the precaution to reduce it. Chemical pollution of environment and annual world production & consumption of pesticides.	2
5	Different strategies used in pest control: Natural, agricultural, and mechanical control methods. Physical control and legal control	2
6	Different strategies used in pest control: 1- Biological control: The biological control history and definitions; The procedures adopted in biological control. Biological control organisms: entomophagous insect orders, advantages and disadvantages.	2
7	2- Microbial control: The definition and traits desirable in pathogens. Principles groups of pathogens. Toxin produced by microbes. Synergism between micro-organisms and insecticides. Host resistance to pathogen. Methods of application and mass production of pathogens. Advantages and disadvantages.	2
8	Different strategies used in pest control: 3- Hormonal control: The endocrine system of insects. Kinds of insect hormones. Function of insect hormones. Concepts of hormonal control of insects. Insect hormone-mimics in non-insectan organisms. Advantages and disadvantages.	2
9	4- Pheromonal or behavioral control: Principles of behavioral control, and chemicals to which insects react. Mode of pheromones application, pest management with pheromones. Advantages and disadvantages.	2
10	5- Radiations or chemosterilant as controlling agents: Definition and classification of chemosterilants. Mode of application and field trials. Advantages and disadvantages	2
11	6- Genetic control: Definition and methods of genetic control. Advantages and disadvantages.	2
12	Integrated pest management program (IPM): The definition, logic and necessity of IPM. Tools of IPM. Ecology versus IPM. Kind of pests and economic injury. Integration of existing methods.	2
13	The definition of organic agriculture and why it's needed	2
14	Examples of insect pest orders: Orthoptera, Hemiptera, Lepidoptera, Hymenoptera, Diptera	2
15	General 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 the different types of pests.	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	Define the major concepts in field of pest control and pesticides toxicology. As well as the major applications of pest control and pesticides toxicology in solving biological and environmental problems.		
1.3	Apprehend the basic information and techniques related to pest control and pesticides toxic.		
1.4	Illustrate the role of ecosystem in controlling pests.		
1.5	Illustrate the working knowledge of the environmentally and friendly pesticides and its benefits.		
2.0	**Skills:**		
2.1	Summarize the relationships between pests and human health and economic loss. Then discuss the integrated pest management.	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 lists of pests, victors and biological control species. Then, describe the life cycle of selected species		
2.3	Apply field applications. Submit individual or team reports		
2.4	Develop skills for identification, drawing and summarize general characters of pests and vector species.		
2.5	Dealing with pest and vector collection, sorting and report them as presentation.		
2.6	Differentiate between adult and larval stages of studied species.		
3.0	**Competence:**		
3.1	Personal leader ship activity	Follow up, correction, reorientation of their activities.	Written and practical exams.
3.2	Self-learning in teamwork.	Discussion	Evaluation
…	Reports and presentations	Discussion	Oral exam

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	Srivastava, K.P. (1996): Text Book Of Applied Entomology. Kalyani publishers. New Delhi Pat O'Connor-Marer 2006. Residential, Industrial, and Institutional Pest Control. UCANR Publications. pp. 2–17. ISBN 978-1-879906-70-9. Thacker, J.R.M. 2002. An Introduction to Arthropod Pest Control. Cambridge University Press. p. 193. ISBN 978-0-521-56787-9. Lecture notes of Department.
Essential References Materials	Hahn, Jeffrey; Jesse, Laura; Pellitteri, Phil. 2017 "Insect pests of stored foods". University of Minnesota Extension. 2017. Cook, R. J. 1991. Biological Control of Plant Diseases: Broad Concepts and Applications, Technology Bulletin No. 123. Taipei City, Republic of China on Taiwan: Food and Fertilizer Technology Center. DeBach, P. 1974. Biological Control by Natural Enemies. New York: Cambridge University Press. Edwards, C. R. 1991. National organization promotes integrated pest management. Am. Entomol. 37:136-137. Fitchen, J. H., and R. N. Beachy. 1993. Genetically engineered protection against viruses in transgenic plants. Annu. Rev. Microbiol. 47:739-763.
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.

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.**
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**	