



Course Specifications

Revised November 2019

Course Title:	Virology and Bacteriology
Course Code:	4013402-3
Program:	BSc Biology
Department:	Department of Biology
College:	Faculty of Applied Science
Institution:	UM AL – QURA UNIVERSITY
Revision Date	November 2019

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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: 3rd Year / Level 6
4. Pre-requisites for this course (if any): General Biology (40111101)
5. Co-requisites for this course (if any):

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	Practical/Field work/Internship	6
5	Others (specify)	30
	Total	66
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

- ❖ This course deals the history, discovering, occurrence, general characteristics of the microorganisms in the environment, as well as its important roles in the environment. Give a short description about the differentiations between prokaryotic and Eukaryotic cells. Describe the bacterial cell structure and summarize the role of each component in the cell. Also, nutritional requirements for bacteria, study the factors effect of bacterial growth will be covered. Describe and studying properties of some bacterial genera important for plant and soils, human, animal, foods, water. Also, short description about virus identification, structure, types, as well as plant, animal, human diseases well be covered. Also, this course introduce short description for: (Microorganisms in Soil, Microorganisms in Food and dairy -Microorganisms in water)

2. Course Main Objective

After completing this course student should be able to:

- List the roles of microorganisms in the life and in different fields
- Define basic structures between Eukaryotic and prokaryotic cells.
- Explain the fine structure of bacteria.
- Discuss the different between gram positive and negative bacteria.
- Differentiate between the different genera of bacteria.
- Describe the bacterial growth curve.
- Summarize the factors effect on bacterial growth
- Summarize the nutritional requirements of bacteria
- List the different microorganisms caused plant, animal and human diseases
- Review the history and principles of virology.
- List the general properties of viruses
- Write the different types of viruses
- Describe the basic structure of viruses.
- Differentiate between viruses and other microorganisms.
- State the characteristics used to classify viruses.
- List the taxonomic groups of viruses.
- Describe the process of viral replication and reproduction.
- Summarize the common plants virus diseases.
- Discuss the economic importance of animal and plant viruses.
- Describe the symptom infection by some human viruses
- Discuss how viruses are transmitted and the application of control measures.
- Summarize the different methods for isolation and purification of viruses

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge: Upon successful completion of this course The student will be able to: <ul style="list-style-type: none"> • List the important roles of microorganisms in the life and in different fields • Aware with all bacterial groups and their importance • Define the virology term • List the economic important for the viruses and bacteria • List the general properties of viruses 	

CLOs		Aligned PLOs
	<ul style="list-style-type: none"> • Write the different types of viruses • Describe the basic structure of viruses. • State the principle used to classify viruses. • List the taxonomic groups of viruses. • Summarize the symptom plant virus diseases. • Describe the symptom infection by some human viruses • Write the differentiation between Eukaryotic and prokaryotic cells • Differentiate between the different genera of bacteria. • Summarize the factors effect on bacterial growth • Summarize the nutritional requirements of bacteria • Summarize the general properties of viruses • Write the principle or the basis for classification viruses. • List the taxonomic groups of viruses according Baltimore. • Summarize the common plants virus diseases. • Discuss the economic importance of animal and plant viruses. • Describe the symptom infection by some human viruses • Write the rapid methods used for detection of human viruses. 	
2	Skills:	
2.1	<p>Cognitive skills to be developed</p> <p>Having successfully completed the course students should be able to:</p> <ul style="list-style-type: none"> • Explain the fine structure of bacteria. • Differentiate between the different genera of bacteria. • Describe the bacterial growth curve. • Explain why Gram negative could not keep the crystal violet during Gram staining. • Interpret why Gram positive kept the crystal violet during Gram staining • Discus the factors effect on bacterial growth • Describe the reproduction methods in bacteria and virus. • Describe the basic structure of viruses. • Interpret why viruses can't life outside the hosts • Discuss how viruses are transmitted to the host. • Explain the different methods for isolation and purification of viruses. • Differentiate between viruses and other microorganisms • Compare between the plant and animal viruses regarding the structure. • Describe the process of viral replication and reproduction. • Predict from the symptoms type the virus. 	
2.4.	<p>Psychomotor Skills</p> <p>Upon successful completion of this course, the student is expected to be able to:</p> <ul style="list-style-type: none"> • Perform the laboratory experiments precisely • operate all devices in lab • Preparation different media for isolation and cultivation of bacteria 	

CLOs		Aligned PLOs
	<ul style="list-style-type: none"> Cultivate the bacterial isolates on the agar plates. diagram the virus and bacterial structure draw virus replication 	
3	Competence:	
3.1	<ul style="list-style-type: none"> Choose the suitable media and method for isolation different microbes from different habitats. Describe the structure of the virus Enhancing the ability of students to use computers and internet. Communicating personal ideas and thoughts. Work independently and as part of a team to finish some assignments. Communicate results of work to others. Demonstrate professional attitudes and behaviors towards others. Propose the smart questions Understand and dissecting the problem so that it is fully solved understood. Demonstrate the assertiveness for his decision. Demonstrate his capability for the responsibility and Accountability Show effective verbal communication with clarity and must be characterize with the following interpersonal attributes; (verbal communication, non-verbal communication, good listening for the others, questioning, good manners, Problem solving, social awareness, self-management, responsibility and accountability). Enhancing the ability of students to use computers and internet. Interpret the laboratory data Know how to write a report 	

C. Course Content

1 Topics to be Covered		
Topic	No of Weeks	Contact hours
❖ Introduction: -History and discovery of viruses and bacteria An overview about the roles of viruses and bacteria in the environment and their applications in different fields - Distribution of viruses and bacteria in the environment - Different between the viruses, prokaryotes and Eukaryotes	1	2
❖ General Virology - Nomenclature and classification of viruses - Distinctive properties of viruses - Morphology and ultra-structure - Capsids and their arrangements - Types and structures of viral envelopes. - Viral genome composition. - Virus related agents (viroids, prions, satellites).	2	4

<ul style="list-style-type: none"> ❖ Bacterial Viruses <ul style="list-style-type: none"> -General Properties of bacterial viruses - Bacteriophage structural organization. - Life cycle. ❖ Plant Viruses <ul style="list-style-type: none"> -General Properties of plant viruses - Classification and nomenclature. ❖ Animal Viruses <ul style="list-style-type: none"> -General Properties of bacterial viruses - Classification and nomenclature of animal human viruses - Epidemiology, lifecycle, pathogenicity. - Examples of certain important viral disease 	2	4
<ul style="list-style-type: none"> ❖ Nomenclature of bacteria <ul style="list-style-type: none"> - Identification - Classification - Morphological characteristics - Phenotypic of bacteria - Genotypic of bacteria - Bergey's Manual of determinative Bacteriology -Bergey's Manual of Systematic Bacteriology 	1	2
<ul style="list-style-type: none"> ❖ Growth of bacteria <ul style="list-style-type: none"> - Media and growth conditions for diverse bacteria -Sterilization methods -Methods for culturing bacteria - Nutritional elements, Oxygen, light, vitamins requirements 	1	2
<ul style="list-style-type: none"> ❖ Bacterial motility <ul style="list-style-type: none"> - Swimming by flagella - Gliding - Rotary 	3	6
<ul style="list-style-type: none"> ❖ Bacterial staining <ul style="list-style-type: none"> - Simple Stains:(positive stain and negative stain) - Compound or differential stains: Gram stain (different between G⁺ and G⁻) Spore stain Acid fast stain 	2	4
<ul style="list-style-type: none"> ❖ Bacterial cell structure <ul style="list-style-type: none"> - Cell wall - Protoplast - Cytoplasmic membrane - Cytoplasmic contents: -Bacterial genome and plasmids - Stored materials - Gas Vacuoles -Spores (in some cases) 	1	2

❖ Bacterial reproduction -Reproduction methods in bacteria - Bacterial growth curve - Factors affect the growth curve of bacteria	2	4
❖ Short Description for: - Some bacterial genera important for plant and soils -Some bacterial genera cause diseases for human and animal -Some important bacteria used in foods, pharmaceuticals	2	4
	14 weeks	28hrs

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	<p>Upon successful completion of this course The student will be able to:</p> <ul style="list-style-type: none"> • List the important roles of microorganisms in the life and in different fields • Aware with all bacterial groups and their importance • Define the virology term • List the economic important for the viruses and bacteria • List the general properties of viruses • Write the different types of viruses • Describe the basic structure of viruses. • State the principle used to classify viruses. • List the taxonomic groups of viruses. • Summarize the symptom plant virus diseases. • Describe the symptom infection by some human viruses • Write the differentiation between Eukaryotic and prokaryotic cells • Differentiate between the different genera of bacteria. • Summarize the factors effect on bacterial growth • Summarize the nutritional requirements of bacteria • Summarize the general properties of viruses • Write the principle or the basis for classification viruses. 	<p>-The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions.</p> <p>- Students will be given opportunity to understand the role of important microorganisms in different applications and human service.</p> <p>- At the end of the programme, students will be divided into groups for seminar presentation on important areas of the course to assess their understanding and comprehension of the course.</p> <p>- All students will be involved in on-line learning process and each student is required to create an E-mail address to facilitate student web interactions.</p> <p>- Using images and movies</p> <p>- Encouraging students</p>	<p>- Periodical exam (1) (10%)</p> <p>- Periodical exam (2) (10%)</p> <p>- Report and activity (10%)</p> <p>- Mid- term theoretical exam (20%)</p> <p>Final exam (50%)</p>

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	<ul style="list-style-type: none"> List the taxonomic groups of viruses according Baltimore. Summarize the common plants virus diseases. Discuss the economic importance of animal and plant viruses. Describe the symptom infection by some human viruses Write the rapid methods used for detection of human viruses. 	<p>to collect the new information about what the new in virology and bacteriology</p> <ul style="list-style-type: none"> Enable the reference books and scientific sites concerning virology and bacteriology in internet. 	
2.0	Skills		
2.1	<p>Cognitive skills</p> <p>Having successfully completed the course students should be able to:</p> <ul style="list-style-type: none"> Explain the fine structure of bacteria. Differentiate between the different genera of bacteria. Describe the bacterial growth curve. Explain why Gram negative could not keep the crystal violet during Gram staining. Interpret why Gram positive kept the crystal violet during Gram staining Discuss the factors effect on bacterial growth Describe the reproduction methods in bacteria and virus. Describe the basic structure of viruses. Interpret why viruses can't life outside the hosts Discuss how viruses are transmitted to the host. Explain the different methods for isolation and purification of viruses. Differentiate between viruses and other microorganisms Compare between the plant and animal viruses regarding the structure. Describe the process of viral replication and reproduction. Predict from the symptoms type the virus. 	<ul style="list-style-type: none"> Lectures Brain storming Discussion 	<ul style="list-style-type: none"> Exam must contain questions that can measure these skills. Discussions after the lecture. Quiz and exams
2.2	<p>Psychomotor Skills</p> <p>Upon successful completion of this course, the student is expected to be</p>	<p>Follow up the students during collection of some virus infected plants samples from the</p>	<ul style="list-style-type: none"> Giving additional marks for the students they collect different viral and bacterial

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	<p>able to:</p> <ul style="list-style-type: none"> • Perform the laboratory experiments precisely • operate all devices in lab • Preparation different media for isolation and cultivation of bacteria • Cultivate the bacterial isolates on the agar plates. • diagram the virus and bacterial structure • draw virus replication 	environment	strains infected animal or plants from the environment - Practical exam.
3.0	Competence		
3.1	<ul style="list-style-type: none"> • Choose the suitable media and method for isolation different microbes from different habitats. • Describe the structure of the virus • Enhancing the ability of students to use computers and internet. • Communicating personal ideas and thoughts. • Work independently and as part of a team to finish some assignments. • Communicate results of work to others. • Demonstrate professional attitudes and behaviors towards others. • Propose the smart questions • Understand and dissecting the problem so that it is fully solved understood. • Demonstrate the assertiveness for his decision. • Demonstrate his capability for the responsibility and Accountability • Show effective verbal communication with clarity and must be characterize with the following interpersonal attributes; (verbal communication, non-verbal communication, good listening for the others, questioning, good manners, Problem solving, social awareness, self-management, responsibility and accountability). • Enhancing the ability of students to use computers and internet. • Interpret the laboratory data • Know how to write a report 	<ul style="list-style-type: none"> - Open class discussions with students for minutes during lectures - certain topics of the course. - Case Study - Active learning - Small group discussion 	<ul style="list-style-type: none"> - Oral exams. -Evaluate the efforts of each student in preparing the report. -Evaluate the scientific values of reports. -Evaluate the work in team -Evaluation of students presentations -Homework (preparing a report on some topics related to the course - depending on web sites). Seminars presentation

2. Assessment Tasks for Students

5. Schedule of Assessment Tasks for Students During the Semester				
Assessment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Exam duration	Proportion of Final Assessment
1	Periodical Exam (s)	4	15 min	10 %
2	Mid Term Exam (Theoretic)	8	60 min	30 %
3	Mid Term Exam (practical)	--	--	--
4	Reports and essay	11	--	20 %
5	Final Practical Exam	--	--	--
6	Final Exam	16	120 min	40 %
Total Marks				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 :

Office hours: 10hrs.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> Principles of Virology: 2004. 2nd ed. S. J. Flint, et al. ASM Press. Plant virology 3rd edition. R.E.F., Matthews (2006).
Essential References Materials	<ul style="list-style-type: none"> John B. Carter, Venetia A. Saunders, (2007) Virology: principles and applications .John Wiley and Sons– 358 pages
Electronic Materials	http://microbiology.columbia.edu/virology.html
Other Learning Materials	<ul style="list-style-type: none"> PPT prepared by Prof. Khaled Elbanna

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration	<ul style="list-style-type: none"> Class room is already provided with data show The area of class room is suitable concerning the

Item	Resources
rooms/labs, etc.)	number of enrolled students (68) and air conditioned
Technology Resources (AV, data show, Smart Board, software, etc.)	<ul style="list-style-type: none"> Digital lab containing 15 computers.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	<ul style="list-style-type: none"> Incubators, autoclaves, measuring equipment, water bath, digital balances, pH meters, safety facilities. Availability of some reference microorganisms strains Different media All chemicals and reagents that needed Availability all slides of bacterial strains

G. Course Quality Evaluation

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> Questionaries Open discussion in the class room at the end of the lectures.
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"> Revision of student answer paper by another staff member. Analysis the grades of students.
3. Processes for Improvement of Teaching <ul style="list-style-type: none"> Preparing the course as PPT. Using scientific movies. Coupling the theoretical part with laboratory part Periodical revision of course content.
4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution) <ul style="list-style-type: none"> After the agreement of Department and Faculty administrations
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. <ul style="list-style-type: none"> Periodical revision by Quality Assurance Units in the Department and institution

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

Prepared by faculty staff: 1. Dr. Khaled Elbanna	Signature:
Date Report Completed: 1.04.2018	
Revised by: 1. Dr. Khaled Elbanna. 2. Dr. Hussein H. Abulreesh. 3. Dr. Shady M. ElShehawy.	Signature:
Date: 1.04.2018	
Program Chair Dr. Hussein H. Abulreesh.	Signature:
Dean	Signature:
Date:	

