



Course Specifications

Revised November 2019

Course Title:	Antimicrobial Agents
Course Code:	4013421
Program:	Microbiology
Department:	BSc Microbiology
College:	Faculty of Applied Science – Department of Biology
Institution:	UM AL – QURA UNIVERSITY
Revision Date	November 2019

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B. Course Objectives and Learning Outcomes

1. Course Description

This course aims to give students through knowledge of the mode of action of clinically relevant antimicrobial agents, mechanisms of drug resistance, isolation and identification of novel antimicrobial resistant organisms. Topics covered: review of the main groups of antimicrobial agents; detailed examination of clinically useful antimicrobial agents; modes of action, spectrum of activity; major limitation to use; development of resistance; molecular basis of resistance; novel antibiotics isolation, characterization and development .

2. Course Main Objective

After completing this course student should be able to:

- Describe the general characteristics of antimicrobial agents
- Understand the mode of action of antimicrobial agents
- Understand the mechanisms of drug resistance
- Describe the transmission of drug resistance genes and drug resistant pathogens in the environment and clinical settings.
- Understand how to overcome resistance and developing novel antimicrobial drugs.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
	<p>Upon successful completion of this course, the student will be able to:</p> <ul style="list-style-type: none"> • Describe the general characteristics of antimicrobial agents • Understand the mode of action of antimicrobial agents • Understand the mechanisms of drug resistance • Describe the transmission of drug resistance genes and drug resistant pathogens in the environment and clinical settings. • Understand how to overcome resistance and developing novel antimicrobial drugs. 	
2	Skills:	
2.1	<p>Cognitive skills to be developed</p> <ul style="list-style-type: none"> ❖ Having successfully completed the course students should be able to: <ul style="list-style-type: none"> • Describe the general characteristics of antimicrobial agents • Understand the mode of action of antimicrobial agents • Understand the mechanisms of drug resistance • Describe the transmission of drug resistance genes and drug resistant 	

CLOs		Aligned PLOs
	<p>pathogens in the environment and clinical settings.</p> <ul style="list-style-type: none"> Understand how to overcome resistance and developing novel antimicrobial drugs. 	
2.2.	<p>Psychomotor Skills</p> <ul style="list-style-type: none"> Upon successful completion of this course, the student is expected to be able to: <ul style="list-style-type: none"> Perform the laboratory experiments precisely Operate all devices in lab Diagram growth curve of bacteria. Assemble and collect important bacterial isolates Prepare different media Cultivate the bacterial isolates Carry out bacterial identification techniques. 	
3	<p>Competence:</p> <ul style="list-style-type: none"> Upon successful completion of this course, the student is expected to be able to: <ul style="list-style-type: none"> Developing oral presentations. Communicating personal ideas and thoughts. Work independently and as part of a team to finish some assignments. Communicate results of work to others. Use of needed precautions when dealing with pathogen microorganisms 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: -An overview of antimicrobial chemotherapy - Historical background - Main groups of antimicrobial agents	1	2
❖ Antimicrobial agents - Clinically relevant antimicrobial agents - Mode of action -Spectrum of activity -Major limitation to use	3	6
❖ Antimicrobial drug resistance I - development of resistance -biochemical basis of drug resistance - molecular basis of drug resistance	3	6
❖ Antimicrobial drug resistance II - resistance in clinical environments - transmission of resistance genes in the environment - measures to reduce the occurrence of resistance	2	4
❖ Antifungal and antiseptic agents - Clinical relevant antifungal agents - Mode of action -spectrum of activity	1	2
❖ Antiviral agents - clinically relevant antiviral agents - mode of action - spectrum of activity	1	2
❖ Existing Antimicrobial agents -improve existing antimicrobial agents - increase spectrum of activity - overcome resistance	2	4
❖ Novel antimicrobial agents -developing novel antimicrobial agents -role of industry - industrial process	1	2
	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	<ul style="list-style-type: none"> ❖ Upon successful completion of this course, the student • describe the general characteristics of antimicrobial agents • understand the mode of action of antimicrobial agents • understand the mechanisms of drug resistance • describe the transmission of drug resistance genes and drug resistant pathogens in the environment and clinical settings. • understand how to overcome resistance and developing novel antimicrobial drugs. 	<ul style="list-style-type: none"> - The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions. -Students will be given opportunity to understand the role of important microorganisms in different applications and human service. - 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. - 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. - Using images and movies -Encouraging students to collect the new information about what the new bacteriology - Enable the reference books and scientific sites concerning bacteriology in internet. 	<ul style="list-style-type: none"> • Periodical exam and reports 10% • Mid- term theoretical exam 20% • Mid-term practical exam 5% • Final practical exam 15% • Final exam 50%

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.0	Skills		
2.1	<p>Cognitive skills</p> <ul style="list-style-type: none"> ❖ Having successfully completed the course students should be able to: • Describe the general characteristics of antimicrobial agents • Understand the mode of action of antimicrobial agents • Understand the mechanisms of drug resistance. • Describe the transmission of drug resistance genes and drug resistant pathogens in the environment and clinical settings. • Understand how to overcome resistance and developing novel antimicrobial drugs. 	<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. • Quiz and exams. • Discussions after the lecture.
2.2	<p>Psychomotor Skills</p> <ul style="list-style-type: none"> ❖ Upon successful completion of this course, the student is expected to be able to: • Perform the laboratory experiments precisely • Operate all devices in lab • Diagram growth curve of bacteria. • Assemble and collect important bacterial isolates • Prepare different media • Cultivate the bacterial isolates • Carry out bacterial identification techniques 	<ul style="list-style-type: none"> • Follow up students the students in lab and during carryout all the laboratory experiments 	<ul style="list-style-type: none"> • Giving additional marks for the students they have accurate laboratory results and good seminar presentation • Practical exam.
2.3			
3.0	Competence		
	<ul style="list-style-type: none"> ❖ Upon successful completion of this course, the student is expected to be able to: • Developing oral presentations. • Communicating personal ideas and thoughts. • Work independently and as part of a team to finish some assignments. • Communicate results of work to others. • Use of needed precautions when 	<ul style="list-style-type: none"> • Lab work • Case Study • Active learning • Small group discussion • Homework (preparing a report on some topics related to the course depending on web sites). • Seminars presentation 	<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 the role of each

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	<p>dealing with pathogen microorganisms</p> <ul style="list-style-type: none"> • 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"> • Practical during carryout the experiments in the lab. 	<p>student in lab group assignment</p> <ul style="list-style-type: none"> • Evaluation of students presentations

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	20 %
3	Mid Term Exam (practical)	9	30 min	10 %
4	Reports and essay	11	--	5 %
5	Final Practical Exam	15	60 min	15 %
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"> Course note and PPT prepared by faculty member responsible for the course: Associate Prof. Dr. Khaled Elbanna. <ul style="list-style-type: none"> -Antibacterial chemotherapeutic agents, by Dax S. L.; Publisher: Blackie Academic Professional (1996). -Russell, A. D. & Chopra I. (1996). Understanding antibacterial action resistance. Ellis Horwood
Essential References Materials	.
Electronic Materials	
Other Learning Materials	<ul style="list-style-type: none"> PPT prepared by faculty member responsible for the course: Associate Prof. Dr. Khaled Elbanna.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> Class room is already provided with data show The area of class room is suitable concerning the 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, centrifuge, measuring equipment, water bath, digital balances, pH meters, safety facilities. Availability of some reference pathogenic bacterial and fungal strains Availability of some reference bacterial strains Availability new light microscopes Availability different specific media and chemicals used for isolation Different media All chemicals and reagents that needed

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)

- After the agreement of Department and Faculty administrations

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- 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. Prof. Dr. Khaled Elbanna	Signature:
Date Report Completed: November 2019	
Revised by: 1. Dr. Khaled Elbanna 2. Dr. Hussein H. Abulreesh 3. Dr. Shady Elshahawy	Signature:
Date: November 2019	
Program Chair Dr. Hussein H. Abulreesh	Signature:
Dean	Signature:
Date:	