# Course Specifications

**Revised November 2019**

| | |
|---|---|
| **Course Title:** | **Medical Microbiology** |
| **Course Code:** | **4013472-3** |
| **Program:** | **BSc Microbiology** |
| **Department:** | **Department of Biology** |
| **College:** | **Faculty of Applied Science – Department of Biology** |
| **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 ☐ 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):** | **Bacteriology (4012422-3)** |
| **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** | **42** |
| 3 | **Tutorial** | **-** |
| 4 | Practical/Field work/Internship | **6** |
| 5 | **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

This course is designed for students of Applied Microbiology to cover the basic principles of Medical microbiology and infectious disease. It covers mechanisms of infectious disease transmission, principles of aseptic practice, and the role of the human body's normal microflora. The biology of bacterial, viral, fungal, and parasitic pathogens and the diseases they cause are covered. Relevant clinical examples are provided. The course provides the conceptual basis for understanding pathogenic microorganisms and the mechanisms by which they cause disease in the human body. It also provides opportunities to develop informatics and diagnostic skills, including the use and interpretation of laboratory tests in the diagnosis of infectious diseases.

### 2. Course Main Objective

❖ **After completing this course student should be able to:**

- Define the medical Microbiology
- list the important pathogen bacterial genera that cause human disease.
- describe the methodology for isolation and identification of pathogens
- Summarize the internal and external structure of the pathogen bacterial cells.
- List the diseases caused by pathogen microorganisms.
- Recognize the symptom of diseases caused by pathogen microorganisms
- Develop familiarity with the major types of pathogenic microorganisms and the diseases that they produce in humans.
- Demonstrate the ability to use the laboratory to diagnose infections, including appropriate specimen collection and test ordering.
- Outline the principle of diseases and its distribution
- List the suitable antibiotics to treat of each disease.
- Explain, analyze and interpret the laboratory findings.
- Differentiate between the symptom of fungal and bacterial pathogens
- Write briefly the general characterizations of each pathogen bacterial group

### 3. Course Learning Outcomes

| | CLOs | Aligned PLOs |
|---|---|---|
| 1 | **Knowledge:** | |
| | ❖ Upon successful completion of this course The student will be able to:<br>• Define the medical Microbiology<br>• List the important pathogen bacterial genera that cause human disease.<br>• Describe the methodology for isolation and identification of pathogens<br>• Summarize the internal and external structure of the pathogen bacterial cells.<br>• List the diseases caused by pathogen microorganisms.<br>• Recognize the symptom of diseases caused by pathogen microorganisms<br>• Familiarize with the major types of pathogenic microorganisms<br>• List the suitable antibiotics to treat of each disease.<br>• Demonstrate the ability to use the laboratory to diagnose infections, including appropriate specimen collection and test ordering.<br>• Outline the principle of diseases and its distribution<br>• Write briefly the general characterizations of each pathogen bacterial group. | |
| 2 | **Skills:** | |

| | CLOs | Aligned PLOs |
|---|---|---|
| 2.1 | **Cognitive skills**<br>Upon successful completion of this course The student will be able to:<br>• Summarize the internal and external structure of the pathogen bacterial cells.<br>• Develop familiarity with the major types of pathogenic microorganisms and the diseases that they produce in humans..<br>• Explain, analyze and interpret the laboratory findings.<br>• Differentiate between the symptom of fungal and bacterial pathogens**.**<br>• Write briefly the general characterizations of each pathogen bacterial group. | |
| | | |
| 2.4. | **Psychomotor Skills**<br>Upon successful completion of this course, the student is expected to be able to:<br>• Perform the laboratory experiments precisely<br>• Operate all devices in lab<br>• Ability to identify all pathogenic microorganisms.<br>• Assemble and collect important pathogenic bacterial isolates<br>• Prepare different media<br>• Cultivate the bacterial isolates | |
| **3** | **Competence:** | |
| 3.1 | Upon successful completion of this course, the student is expected to be able to:<br>• Developing oral presentations.<br>• Communicating personal ideas and thoughts.<br>• Work independently and as part of a team to finish some assignments.<br>• Communicate results of work to others.<br>• Use of needed precautions when dealing with pathogen microorganisms<br>• Demonstrate professional attitudes and behaviors towards others.<br>• Propose the smart questions<br>• Understand and dissecting the problem so that it is fully solved understood.<br>• Demonstrate the assertiveness for his decision.<br>• Demonstrate his capability for the responsibility and Accountability<br>• 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).<br>• Enhancing the ability of students to use computers and internet.<br>• Interpret the laboratory data.<br>• Know how to write a report. | |

## C. Course Content

| 1 Topics to be Covered | | |
|---|---|---|
| **Topic** | No of Weeks | Contact hours |
| ❖ **Introduction:**<br>- An Historical Overview about the Medical Microbiology and the role of scientists to developing this field. | **1** | **2** |
| ❖ **Bacterial Classification, Morphology & Cell Structure:** medically important groups of microorganisms, classification (taxonomy) of bacteria, morphology (cell shapes, Gram stain), ultrastructural features internal and external bacterial cell structure (cytoplasm, cell envelope, external features), bacterial spores. | **1** | **2** |
| ❖ **Most medical important bacterial genera**<br>Role of the natural microfolora of the human body . | **2** | **4** |
| ❖ Distribution of natural Gram positive and Gram-negative microflora according to its location to the human body . | **2** | **4** |
| ❖ Antibiotics:<br>- Definition<br>- Classification<br>-Suitable Dosages<br>- Mode of actions<br>- Precautions that mast be taking in consideration when the antibiotic were used. | **2** | **4** |
| ❖ **Important human pathogens of Gram-positive cocci:** (Classification, the pathogencity, methods used for detection)<br>- **The Gram-Positive Cocci – I:** *Staphylococcus aureus* (cutaneous infections, food poisoning, endocarditis, toxic shock syndrome, etc.), *Staphylococcus epidermidis* (endocarditis, catheter & shunt infections, etc.), *Enterococcus* (urinary infections, septicemia, etc.).<br>- **The Gram-Positive Cocci – II:** *Streptococcus pyogenes* (pharyngitis, impetigo, erysipelas, rheumatic fever, etc.), *Streptococcus pneumoniae* (pneumococcal pneumonia, otitis media, sinusitis, meningitis, etc.), *Streptococcus agalactiae* (neonatal diseases, other infections). | **2** | **4** |
| ❖ Important human pathogens of Gram-negative cocci (Classification, the pathogenicity, methods used for detection) | **1** | **2** |
| ❖ Important human pathogens of Gram-negative bacilli : Enterobacteriaceae: Classification, the pathogenicity, methods used for detection):<br>-**The Gram-Negative Aerobic Bacilli:** *Pseudomonas aeruginosa* (pulmonary, skin & urinary infections, etc.), *Bordetella pertussis* (whooping cough), *Francisella tularensis* (tularemia), *Brucella* (undulant fever, etc.), *Haemophilus* (meningitis, otitis, chancroid, arthritis, etc.), *Legionella pneumophila* (Legionnaires' Disease, Pontiac fever). | **1** | **2** |

| | | |
|---|---|---|
| ❖ **Important human pathogens of Gram-positive bacilli:** Classification, the pathogenicity, methods used for detection): **The Gram-Positive Bacilli:** *-Bacillus anthracis* (anthrax), *Listeria monocytogenes* (neonatal diseases, etc.), *Corynebacterium diphtheriae* (diphtheria), *Clostridium perfringens* (gasgangrene, food poisoning, etc.), *Clostridium tetani* (tetanus), *Clostridium botulinum* (botulism), *Clostridium difficile* (gastroenteritis), *Erysipelothrix rhusiopathiae* (erysipeloid). | **1** | **2** |
| ❖ **Most important human pathogen Fungi:** Classification, the pathogenicity, methods used for detection) | **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 | Upon successful completion of this course The student will be able to:<br>• Define the medical Microbiology<br>• List the important pathogen bacterial genera that cause human disease.<br>• Describe the methodology for isolation and identification of pathogens<br>• Summarize the internal and external structure of the pathogen bacterial cells.<br>• List the diseases caused by pathogen microorganisms.<br>• Recognize the symptom of diseases caused by pathogen microorganisms<br>• Familiarize with the major types of pathogenic microorganisms<br>• List the suitable antibiotics to treat of each disease.<br>• Demonstrate the ability to use the laboratory to diagnose infections, including appropriate specimen collection and test ordering.<br>• Outline the principle of diseases and its distribution<br>• Write briefly the general characterizations of each pathogen bacterial group. | - The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions.<br>- 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.<br>- 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.<br>-Using images and movies<br>-Encouraging students to collect the new information about what the new in microbial physiology<br>-Make the reference books and scientific sites concerning medical | • Periodical exam and reports 10%<br>• Mid- term theoretical exam 20%<br>• Mid-term practical exam 5%<br>• Final practical exam 15%<br>• Final exam 50% |

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|---|---|---|---|
| | | microbiology in internet avialable. | |
| **2.0** | **Skills** | | |
| 2.1 | **Cognitive skills**<br>Having successfully completed the course students should be able to:<br>• Summarize the internal and external structure of the pathogen bacterial cells.<br>• Develop familiarity with the major types of pathogenic microorganisms and the diseases that they produce in humans..<br>• Explain, analyze and interpret the laboratory findings.<br>• Differentiate between the symptom of fungal and bacterial pathogens.<br>• Write briefly the general characterizations of each pathogen bacterial group. | - Lectures<br>-Brain storming<br>-Discussion | - Exam must contain questions that can measure these skills.<br>- Quiz and exams<br>- Discussions after the lecture. |
| 2.2 | **Psychomotor Skills**<br>Upon successful completion of this course, the student is expected to be able to:<br>• Perform the laboratory experiments precisely<br>• Operate all devices in lab<br>• Ability to identify all pathogenic microorganisms.<br>• Assemble and collect important pathogenic bacterial isolates<br>• Prepare different media<br>• Cultivate the bacterial isolates | - Case Study<br>- Active learning<br>- Small group discussion | • Evaluate the efforts of each student in preparing the report.<br>• Evaluate the scientific values of reports.<br>• Evaluate the work in team<br>• Evaluation of students presentations |
| | | | |
| **3.0** | **Competence** | | |
| | ❖ Upon successful completion of this course, the student is expected to be able to:<br>• Developing oral presentations.<br>• Communicating personal ideas and thoughts.<br>• Work independently and as part of a | • Lab work<br>• Case Study<br>• Active learning<br>• Small group discussion<br>• Homework (preparing a report on some topics related to the | • Oral exams.<br>• Evaluate the efforts of each student in preparing the report.<br>• Evaluate the scientific values of reports. |

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|---|---|---|---|
| | team to finish some assignments.<br>• Communicate results of work to others.<br>• Use of needed precautions when dealing with pathogen microorganisms.<br>• demonstrate professional attitudes and behaviors towards others.<br>• propose the smart questions<br>• understand and dissecting the problem so that it is fully solved understood.<br>• Demonstrate the assertiveness for his decision.<br>• Demonstrate his capability for the responsibility and Accountability<br>• 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).<br>• Enhancing the ability of students to use computers and internet.<br>• Interpret the laboratory data<br>• Know how to write a report | course depending on web sites).<br>• Seminars presentation<br>• Practical during carryout the experiments in the lab. | • Evaluate the work in team<br>• Evaluation of the role of each student in lab group assignment<br>• 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** | (1)- Murray, Patrick.R., Rosenthal, Ken.S., Pfaller, Michael, A., (2009) *Medical Microbiology 6th edition*. Mosby<br><br>(2)- Jawetz, Melnick, & Adelberg's. (2007) *Medical Microbiology 24th edition*. Book Publisher: McGraw-Hill Medical. |
| **Essential References Materials** | - *Sherris Medical Microbiology, 4th Ed.* (2004) Ryan and Ray (Eds.), McGraw-Hill, ISBN: 0-8385-8529-9.<br>-*Medical Microbiology, A Guide to Microbial Infections: Pathogenesis, Immunity, Laboratory Diagnosis, and Control, 16th Ed.* (2002) Greenwood, Slack, and Peutherer (Eds.), Churchill Livingstone; ISBN: 0443-07077-6.<br>-*Medical Microbiology, 3rd Ed.* (2004) Mims, DOckrell, Goering, Roitt, Wakelin, and Zuckerman, Mosby; ISBN: 0-7234-3259-7.<br>- *Medical Microbiology & Immunology: Examination & Board Review, 7th Ed.* (2002) Levinson and Jawetz, Lange Medical Books/McGraw Hill; ISBN: 0-07-138217-8. |
| **Electronic Materials** | -http://www.cdc.gov/mmwr/ |
| **Other Learning Materials** | • **PPT prepared by Dr. Samir Organjii** |

### 2. Facilities Required

| Item | Resources |
|---|---|
| **Accommodation**<br>(Classrooms, laboratories, demonstration rooms/labs, etc.) | • Class room is already provided with data show<br>• The area of class room is suitable concerning the number of enrolled students (68) and air conditioned |
| **Technology Resources**<br>(AV, data show, Smart Board, software, etc.) | • Digital lab containing 15 computers. |
| **Other Resources**<br>(Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | • Incubators, autoclaves, measuring equipment, water bath, digital balances, pH meters, safety facilities.<br>• Availability of some reference bacterial strains<br>• Availability all kits for identification of the microorganisms isolated from different habitates<br>• Availability of **VITEK** device for rapid identification of microorganisms<br>• Different media<br>• All chemicals and reagents that needed |

## G. Course Quality Evaluation

| |
|---|
| **1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching**<br>• Questionaries<br>• 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**<br>• Revision of student answer paper by another staff member.<br>• Analysis the grades of students. |
| **3. Processes for Improvement of Teaching**<br>• Preparing the course as PPT.<br>• Using scientific movies.<br>• Coupling the theoretical part with laboratory part<br>• 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)**<br>• After the agreement of Department and Faculty administrations |
| **5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.**<br>• 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:**<br>**1. Dr. Samir Organjii** | **Signature:** |
| **Date Report Completed: November 2019** | |
| **Revised by:**<br>1. Dr. Khaled Elbanna<br>2. Dr. Hussein H. Abulreesh<br>3. Dr. Shady Elshahawy | **Signature:** |
| **Date:** November **2019** | |
| **Program Chair**<br>Dr. Hussein H. Abulreesh | **Signature:** |
| **Dean** | **Signature:** |
| **Date:** | |