The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Diagnostic Microbiology
0308352

1	Course title	Diagnostic Microbiology
2	Course number	0308352
3	Credit hours (theory, practical)	2 hours theory, 1 hour practical
	Contact hours (theory, practical)	2 hours theory per week and 3 contact hours practical
4	Prerequisites/corequisites	General Microbiology
5	Program title	BSc in Clinical Laboratory Sciences
6	Program code	NA
7	Awarding institution	The University of Jordan
8	Faculty	Science
9	Department	Clinical laboratory Sciences
10	Level of course	Bachelor
11	Year of study and semester (s)	Third year, First semester
12	Final Qualification	Clinical laboratory technologist
13	Other department (s) involved in teaching the course	NA
14	Language of Instruction	English
15	Date of production/revision	July 2018

16. Course Coordinator:

Office numbers: B 029
office hours: 1-2 Daily
phone numbers: 22238
email addresses : s. mattar @ju.edu.jo

17. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed.

NONE

18. Course Description:

This is a diagnostic microbiology course intended for students studying at the department of Clinical Laboratory Sciences.
The course (Lectures and laboratory sessions) will concentrate on the detection and identification of infectious agents in the clinical laboratory, followed by determination of susceptibility to antimicrobial agents. The course will cover general principles of infectious diseases and laboratory diagnosis. The largest section will consists of extensive discussion of groups of infectious agents (bacterial) and the diseases that they produce.

19. Course aims and outcomes:

A- Aims: This is a diagnostic microbiology course intended for students studying at the department of Clinical Laboratory Sciences. The course (Lectures and laboratory sessions) will concentrate on the detection and identification of infectious agents in the clinical laboratory, followed by determination of susceptibility to antimicrobial agents. The course will cover general principles of infectious diseases and laboratory diagnosis. The largest section will consists of extensive discussion of groups of infectious agents (bacterial) and the diseases that they produce. **B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to …**
1. Define basic principles of medical microbiology.
2. Apply theory, microbiology knowledge and technical skills to identify bacteria in the laboratory, appreciating the hazards associated with handling microorganisms in the laboratory and the subsequent safety requirements
3. Identify the etiology, epidemiology and laboratory diagnosis of different diseases.
4. Asses appropriate methods for isolation and identification of infectious agents.
5. Select and asses appropriate methods of infection control to prevent infections.
6. Operate different laboratory procedures in analysis of biological samples.
7. Monitor and control microbial growth and carry out laboratory tests to identify infectious diseases.
8. Control sterilization processes and aseptic procedures.
9. Devise a dichotomous key to aid in the identification of disease-causing bacteria in the lab, and accurately identify disease-causing bacteria by using the key and experimental techniques.
10. Critically analyse the results of clinical investigations;
11. Perform laboratory tests to investigate anti-microbial agents;
12. Communicate using the proper scientific language of the field including clinical laboratory reports written with a professional approach.
13. Work collaboratively and evaluate team work in small groups.

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Microbes and the Science of Microbiology	**1**	**Dr. Suzan Matar**	1,2	**Exams**	**CHAPTER 1** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Understanding Infectious Diseases	**1**	**Dr. Suzan Matar**	1,2,3	**Exams**	**CHAPTER 2** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Combating Pathogens and Infectious Diseases	**2**	**Dr. Suzan Matar**	5	**Exams**	**CHAPTER 3** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Clinical Specimens Used for the Diagnosis of Infectious Diseases	**3**	**Dr. Suzan Matar**	2,3,4,5,6,7,8,10,12	**Exams**	**CHAPTER 5** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Antimicrobial Agents	**5**	**Dr. Suzan Matar**	4,5,6,11	**Exams**	**CHAPTER 7** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk,

					Janet Duben-Engelkirk.
Laboratory methods and strategies in susceptibility testing (Bailey's)	**6**	**Dr. Suzan Matar**	4,5,6,10,11, 12	**Exams**	**Chapter 12:** Tille, P. M., & Forbes, B. A. (2014). Bailey & Scott's diagnostic microbiology (Thi rteenth edition.). St. Louis, Missouri: Elsevier.
General Clinical Microbiology Laboratory Methods	**7**	**Dr. Suzan Matar**	6,7,8,10,11, 12	**Exams**	**CHAPTER 6** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Gram-Positive Cocci	**8**	**Dr. Suzan Matar**	1,2,3,7	**Exams**	**CHAPTER 9** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Gram-Positive and Acid-Fast Bacilli	**9**	**Dr. Suzan Matar**	1,2,3,7	**Exams**	**CHAPTER 10** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Gram-Negative Cocci and Related Bacteria	**10**	**Dr. Suzan Matar**	1,2,3,7	**Exams**	**CHAPTER 11** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.

Gram-Negative Bacilli: The Family Enterobacteriaceae	**11**	**Dr. Suzan Matar**	1,2,3,7	**Exams**	**CHAPTER 12** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Gram-Negative Bacilli: Nonfermenters	**12**	**Dr. Suzan Matar**	1,2,3,7	**Exams**	**CHAPTER 13** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Fastidious and Miscellaneous Gram-Negative Bacilli	**12**	**Dr. Suzan Matar**	1,2,3,7	**Exams**	**CHAPTER 14** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Curved and Spiral-Shaped Bacilli	**13**	**Dr. Suzan Matar**	1,2,3,7	**Exams**	**CHAPTER 15** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Obligate Intracellular Bacteria	**14**	**Dr. Suzan Matar**	1,2,3,7	**Exams**	**CHAPTER 16** Laboratory diagnosis of infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.
Anaerobic Bacteria	**14**	**Dr. Suzan Matar**	1,2,3,7	**Exams**	**CHAPTER 17** Laboratory diagnosis of

					infectious diseases Essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following <u>teaching and learning methods</u>:

1. Power point lectures
2. Videos
3. Audios
4. Journal articles
5. Clinical Cases
6. CDC discussing reports
7. elearning (Moodle)
8. Facebook (Special page for the topics)

22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following <u>assessment methods and requirements</u>:

1. Midterm Exam
2. Final Exam
3. Practical Exam

23. Course Policies:

A- Attendance policies:

Lectures are mandatory for students registered for the course. In general, lecturers can assign a Fail (F) grade for any student with five or more absences from class. Upon a written request from the student, the lecturer may exceptionally grant temporary exemption from attending a specific lecture. Failure to comply with the course attendance policy may imply consequences for the student's final grade as announced in the course syllabus.

B- Absences from exams and handing in assignments on time:

It is expect students to make every effort to take required exams as scheduled. If the student knows in advance that he/she will miss such a requirement, they should notify me. If the student is ill or other circumstances cause him/her to miss a required graded activity, they should notify me as soon as possible. The student must present a letter from an authority (e.g., physician) documenting the reason. Make up exam should be scheduled based on the appropriate circumstances for the lecturer and the student. Students who miss a scheduled make-up will leave the lecturer with little choice but to give the student an "F" on that exam.

C- Health and safety procedures:

The classrooms are equipped with the appropriate flooring, electrical, heating and cooling systems.

In the practical sessions:

- Wash hands frequently.
- Avoid hazardous activities.
- No drinking and eating
- Instruct students in safety issues, such as safe use of equipment prior to commencing each activity.
- Ensure appropriate use is made of all safeguards, safety devices and personal protective equipment.
- Reporting for violent incidents and threats

D- Honesty policy regarding cheating, plagiarism, misbehavior

Any of the above mentioned behaviors should be reported to the deanship office through the head of the department.

E- Grading policy:

THEORY 80 % (Midterm Exam 30%, Final Exam 40%)
LAB 30 % (Final Exam 30%)

F- Available university services that support achievement in the course:

Data show devices, Computer labs and library.

24. Required equipment:

Data show, audio system.

25. References:

A- Required book (s), assigned reading and audio-visuals:

1. Laboratory diagnosis of infectious diseases : essentials of diagnostic microbiology / Paul G. Engelkirk, Janet Duben-Engelkirk.

2. Tille, P. M., & Forbes, B. A. (2014). Bailey & Scott's diagnostic microbiology (Thirteenth edition.). St. Louis, Missouri: Elsevier.

B- Recommended books, materials, and media:

1. Jawetz, Melnick, & Adelberg's Medical Microbiology, 25th Edition, By Geo. F. Brooks, Karen C. Carroll, Janet S. Butel, Stephen A. Morse.

2. A CLASSROOM FACEBOOK PAGE: Medical Microbiology and Immunology/CLS
https://www.facebook.com/groups/517160391789023/?ref=bookmarks
3. Access UJ E-learning portal for the course power point lectures and other supplements.

26. Additional information:

The practical sessions:

Week	Topic	Description
1	Introduction to Diagnostic Bacteriology	- Laboratory Safety Procedures - Specimen-Sampling £ Collection - Culture Media Preparation £ Sterilization
2	Aseptic Technique £ Transfer Of Microorganisms Staining	- Aseptic Technique - The Streak-Plate Technique - Forms of Culture Medium - Colony Morphology and Pigmentation - Gram and Acid Fast Stain
3.	Identification of Gram Positive Cocci (1)	- *Staphylococcus aureus,* - *S. epidermidis* - *S. saprophyticus*
4.	Identification of Gram Positive Cocci (2)	- Beta Streptococci (Groups A,B,C,F,G) - Pneumococcus (*Streptococcus pneumoniae*) - Viridans Streptococci - Enterococci
5.	Aerobic £ Anaerobic Endospore-Forming Bacteria Isolation Of Normal Microbiota From Human Body	- *Bacillus £ Corynebacteriae* - Common microbiota of the nose and throat
6.	Identification Of Gram-Negative Cocci And Coccobacilli	- *Neisseriae* - *Hemophilus*
7.	Identification of Enterobacteriaceae Gram-Negative bacilli	- Fermentative, Enteric Bacilli
8.	Identification of Pseudomonas and Acinetobacter Gram-Negative bacilli	- Non-fermentative, Gram-Negative Bacilli
9.	Isolation Of Normal Microbiota From Human Body A. Urine Culture B. Stool Culture	- Common microbiota of Urine and Stool - Qualitative Urine Culture - Screening for *Salmonella* carriers
10.	Using Antimicrobial Chemotherapeutic Agents To Control Microorganisms	- Antibiotic Susceptibility Testing Kirby-Bauer Assay (Disk Diffusion) Tube Dilution (MIC) & (MBC)

11.	Serological and Biochemical Identification of Microorganisms	- API Staph *for* Identification of clinical staphylococci and micrococci - Quelling test - *Staphurex* - *Streptex Lancefield Grouping* - *ASO titer*

- **Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to …**

1. Apply theory, microbiology knowledge and technical skills to identify bacteria in the laboratory, appreciating hazards associated with handling microorganisms in the laboratory and the subsequent safety requirements
2. Asses appropriate methods for isolation and identification of infectious agents.
3. Operate different laboratory procedures in analysis of biological samples.
4. Monitor and control microbial growth and carry out laboratory tests to identify infectious diseases.
5. Control sterilization processes and aseptic procedures.
6. Devise a dichotomous key to aid in the identification of disease-causing bacteria in the lab, and accurately identify disease-causing bacteria by using the key and experimental techniques.
7. Critically analyse the results of clinical investigations;
8. Perform laboratory tests to investigate anti-microbial agents;
9. Communicate using the proper scientific language of the field including clinical laboratory reports written with a professional approach.
10. Work collaboratively and evaluate team work in small groups.

Name of Course Coordinator: Dr. Suzan Matar Signature: *Suzan Matar* Date: July/2018

Head of curriculum committee/Department: ---------- Signature: ----------

Head of Department: ---------- Signature: ----------

Head of curriculum committee/Faculty: ---------- Signature: ----------

Dean: ---------- -Signature: ----------

Copy to:
Head of Department
Assistant Dean for Quality Assurance

Course File