American University of Beirut
Faculty of Health Sciences
Systematic Bacteriology
MLSP 204 Lab
Spring Semester (AY 2023/2024)

Lab Lecturer: Dr. Mirna Bou Hamdan
Van Dyck Rm 319
Office Hours: T 2:00-4:00 p.m. or by appointment
Email: mb154@aub.edu.lb

Time and Place: Lab Lecture: M 10:00-10:50 am, VD Auditorium
Lab Section 1: T 10:00-12:00 pm, VD 403
W 8:00-10:00 am, VD 403
R 12:00-12:30 pm,VD 403
Lab Section 2: T 12:00-2:00 pm, VD 403
W 10:00-12:00 pm,VD 403
R 12:30-1:00 pm, VD 403

Description

The laboratory component introduces students to the different media required for the isolation and the biochemical tests required for the identification of various medically important bacteria.

Learning Outcomes (LOs)

Upon completion of this course, students should be able to:

1. Process various clinical samples (urine, stool, vagina, CSF, blood, sputum, and miscellaneous body samples) in bacteriology lab.
2. Identify the morphological and microscopic profile of the medically important bacteria.
3. Conduct different microbiological and biochemical tests needed for the full identification of pathogenic bacteria.
4. Interpret the results of the tests done to identify different pathogenic bacteria.
5. Practice advanced antimicrobial susceptibility testing.

Laboratory Material and Readings

Suggested Reference Books:

1. Diagnostic Microbiology; Bailey and Scott's; 15th Ed (2021).

The course material will include lecture handouts and reading assignments. The lecture handouts and PowerPoint presentations will be posted on Moodle prior to class

Student Evaluation

Midterm	35%	LOs 2-4
Unknown I	10%	LOs 2-4
Unknown II	10%	LOs 1-5
Final Exam	40%	LOs 1-5
Attendance & Participation	5%	

*The lab grade is 30% of the total MLSP 204 grade

Course Outline

Week/Date	Lab Session	Lab Lecture	Lab Activity
Week 1 1/22/2024	**1**	**Laboratory Identification of *Bacillus, Listeria, Corynebacterium, Erysipelothrix, Nocardia* and Similar Organisms**	Students will perform the following tests: 1.Gram Stain (Bacterial spores) 2.Motility & tumbling motility tests 3.H2S Production Test 4.Cultivation on blood agar (hemolytic pattern) 5.Acid Fast Stain (Branching filaments) 6.Antimicrobial Susceptibility Testing (Disc Diffusion test)
Week 2 1/29/2024	**2**	**Laboratory Identification of *Enterobacteriaceae spp. I***	Students will cultivate various *Enterobacteriaceae spp.* on the following agar plates: 1.MacConkey 2.XLD 3.SS 4.CLED 5.EMB 6.HE 7.Brilliant Green 8. MH agar for AST (detection of ESBL-producing bacteria)

Week 3 2/5/2024	**3**	**Laboratory Identification of *Enterobacteriaceae spp. II***	Students will perform the following sugar tests: 1. Indole Test 2.Phenol Red Lactose Broth 3.Phenol Red Dextrose Broth 4.Phenol Red Sucrose Broth 5.Kligler Iron Agar 6.Citrate Agar 7.Urea Agar 8.Lysine Iron Agar 9.Ornithine Decarboxylase Agar
Week 4 2/12/2024	**4**	**Laboratory Identification of *Pseudomonas spp.***	Students will perform the following tests: 1.Gram Stain 2.Cultivation on MacConkey agar 3. Oxidase test 4.Pigmentation test 5.Cetrimide Agar Base – Pseudosel Agar Test 6.Oxidative-Fermentative (OF) Semi-solid test 7.Antimicrobial Susceptibility testing
Week 5 2/19/2024	**5**	**Laboratory Identification of Gram-Negative Bacilli and Coccobacilli Other Than *Enterobacteriaceae* and *Pseudomonas***	1. Students will perform oxidase test and cultivate bacteria on MacConkey agar. 2. Students will observe a demonstration of how to perform the Analytic Profile Index (API) test, ELISA test, String test, and latex agglutination test.
	6	**Laboratory Identification of *Haemophilus* spp.**	Students will perform the following: 1. Gram stain 2. X, V and XV tests 3. β-Lactamase test
Week 6 2/26/2024	**Unknown I and Lab Midterm (Lectures 1-6)**		
Week 7 3/4/2024	**7**	**Laboratory Identification of Gram-Negative Bacilli that are Optimally Recovered on Special Media**	Students will observe a demonstration of how to the perform the following tests: 1. Direct Fluorescent Antibody Test 2.Immunochromatography

			assays 3. Campy plate 4. Campy Broth 5. BCYE agar 6. Bordet Gengou agar Base 7. Skirrow's agar
	8	**Laboratory Identification of Bacteria Not Characterized by Gram Stain**	1. Students will perform acid fast stain. 2. Students will observe a demonstration of the following: a. Fletcher's medium b. Weil-Felix test c. Agar-based, liquid-based, and egg-based media used in the cultivation of *Mycobacteria spp.*
Week 8 3/11/2024	**9**	**Laboratory Identification of Anaerobic Bacteria**	1. Students will perform the following: a. cultivation of *Clostridium spp.* on Anaerobic blood agar b. Anaerobic jar incubation 2. Students will observe a demonstration on the latex agglutination test used for the detection of *Clostridium difficile* toxins A & B
	10	**Miscellaneous Tests**	1. Students will perform the following: a. LDC test b. TSI test c. ADH test 2. Students will observe a demonstration of how to perform various other tests: a. Hippurate Hydrolysis test b. PAD test c. Nitrate Reduction test d. Bile Solubility test e. PYR test f. MR-VP test g. ONPG test
Week 9 3/18/2024	**11**	**Advanced Topics in Antimicrobial Resistance**	Students will perform: 1. E-test 2. ESBL test

			3. CRE test 4. D test 5. MDR test
Week 10 3/25/2024	**12**	**Laboratory Identification of Bacterial Infections in Urine and Genital tract Specimens**	Students will perform the following: 1.Urine and genital swabs culture 2.Complete Identification 3.Antimicrobial Susceptibility testing
Week 11* 4/1/2024	**13**	**Laboratory Identification of Bacterial Infections in Stool Specimens**	Students will perform the following: 1. Stool culture 2.Complete Identification 3.Antimicrobial Susceptibility testing
	Unknown II (Lectures 7-12)		
Week 12 4/8/2024**	**14**	**Laboratory Identification of Bacterial Infections in Respiratory Specimens**	**No Lab practice due to Fitr Holiday.**
Week 13 4/15/2024	**15**	**Laboratory Identification of Miscellaneous Specimens**	Students will perform the following: 1.Sputum culture 2.Complete Identification 3.Antimicrobial Susceptibility testing Miscellaneous specimens will be processed (TBD)
Week 14 4/22/2024	**Final Exam (Practical + Theoretical)**		

***The lab lecture of April 1, 2024 will be given on April 2, 2024.**

****The lab practice of week 12 will be performed on week 13 (week of April 15, 2024).**

Course Requirements

- **Attendance:** Attendance will be taken during each session. Students are urged to attend all classes. In case of absence, you will be responsible of the material missed and for any announcements made. **Students who miss more than one-fifth of class sessions are subject to withdrawing from the course with a W-grade (AUB catalogue).**
- **Examination:** Students must take the quizzes, unknowns and final exams on the set date. Make-up exams will be given only in case of emergencies or major illness. Only authorized medical reports will be accepted.
- **Dress Code:** Students will be expected to follow a dress code at the laboratory that follows the safety measures.
- **Academic Integrity:** Cheating and plagiarism will not be tolerated. Review the student Code of Conduct in the student handbook and familiarize yourself with definitions and penalties. If you are in doubt about what constitutes plagiarism, ask your instructor because it is your responsibility to know. The American University of Beirut has a strict anti-cheating policy. Penalties include failing marks on the assignment in question, suspension or expulsion from university and a permanent mention of the disciplinary action in student's records.
- **Students with Disabilities:** AUB strives to make learning experiences accessible for all. If you anticipate or experience academic barriers due to a disability (including learning difficulties, mental health, chronic or temporary medical conditions), please inform the instructor immediately or kindly register with the Accessible Education Office (AEO) (accessibility@aub.edu.lb; +961-1-350000, x3246; West Hall, 314') in order to ensure that you receive the support you need and to facilitate a smooth accommodation process.
- **Non-Discrimination – Title IX – AUB:** In line with its commitment to the principle of equal opportunity in education and employment, AUB policies protect you from discrimination on the basis of protected characteristics, including discriminatory harassment and sexual harassment. The University's non-discrimination policy applies to, and protects, all students, faculty, and staff. If you think you have experienced discrimination, discriminatory harassment, or sexual harassment, we encourage you to inform the Equity/Title IX Coordinator, Ms. Mitra Tauk at 01-350000 ext. 2514, titleix@aub.edu.lb, report to a Title IX deputy at your faculty or at any other faculty (www.aub.edu.lb/titleix), or report online (www.aub.ethicspoint.com). Reports may be submitted anonymously or not.