

**American University of Beirut  
Faculty of Health Sciences  
Introduction to Bacteriology**

**MLSP 203 Laboratory  
Fall Semester (AY 2023/2024)**

**Lab Instructor: Dr. Mirna Bou Hamdan**

Van Dyck Rm 319  
Office Hours: by appointment  
Email: [mb154@aub.edu.lb](mailto:mb154@aub.edu.lb)

**Time and Place:** Lab Lecture: M 10:00-10:50 am, VD Auditorium

Lab Section 1: TW 8:00-9:59 am, VD 403

Lab Section 2: TW 10:00-11:59 am, VD 403

**Description**

The laboratory component of MLSP 203 introduces students to the principles and basic laboratory methods used for bacterial identification including microscopy, culture and antibacterial susceptibility testing with emphasis on the implementation of laboratory safety techniques.

**Learning Outcomes**

Upon completion of this lab, students should be able:

- 1- Apply the Laboratory safety measures required to work in a Bacteriology lab.
- 2- Demonstrate the role and types of microscopy used in a Microbiology Lab.
- 3- Practice the principles and procedures of bacterial staining (mainly Gram stain and acid fast stain).
- 4- Prepare and distinguish between different types of media required for bacterial growth.
- 5- Inoculate selected bacterial species on culture media using different streaking techniques.
- 6- Evaluate colonial morphologies on different culture media.
- 7- Perform the biochemical tests required for the identification of selected genera of bacteria.
- 8- Apply the principles and the classical methods of Antibacterial susceptibility testing.

**Laboratory Material and Readings**

Suggested Reference Books: Diagnostic Microbiology; Bailey and Scott's; 15<sup>th</sup> Ed.

The laboratory material will include lecture handouts and reading assignments. The lecture handouts, PowerPoint presentations and recordings will be posted on Moodle.

Student Evaluation		Meets Objectives
Midterm	30%	LOs 1-5
Unknown I	15%	LOs 1-5
Unknown II	15%	LOs 1-8
Attendance & Participation	5%	
Final Exam	35%	LOs 1-8

\*The lab grade is 25% of the total MLSP 203 grade

## Outline

Week/ Date	Lab Session	Lab Lecture	Lab Activity
Week 1 8/28/2023	1	<b>Introduction to Laboratory Regulations Safety</b>	Knowledge of the laboratory safety regulations and actions to be taken as set by the AUB's Environmental Health, Safety, and Risk Management Department e.g.: 1. Emergency numbers 2. Dos & DON'Ts 3. fire 4. biological spills (Lab practice) 5. disinfection (Lab practice) 6. antiseptics 7. Sterilization 8.waste disposal (Lab practice) 9. handwashing (Lab practice)
	2	<b>Microscopy in Bacterial Studies</b>	Types of Microscopy with emphasis on Compound light microscope (Lab practice)
	<b>Lab Practice (Lectures 1 &amp; 2)</b>		
Week 2 9/4/2023	3	<b>Bacterial Staining I: Gram Stain</b>	Preparation and fixation of bacterial smears (practical training: Gram Stain).
	<b>Lab Practice (Lecture 3)</b>		
Week 3 9/11/2023	4	<b>Bacterial Staining II: Stains Other Than Gram Stain</b>	Types and procedures of: 1.Structural stains 2.Fluorescent stains 3.Acid fast stains (Lab practice)
	<b>Lab practice (Lecture 4)</b>		
Week 4 9/18/2023	5	<b>Media Preparation</b>	Preparation of different types of culture media with emphasis on media sterilization (Lab practice)
	6	<b>Streaking Methods and Aseptic Transfer Techniques</b>	Performance of different types of streaking techniques with emphasis on aseptic transfer from medium to another (Lab practice) e.g.: 1.From broth to broth 2.From broth to slant 3.From broth to deep 4.From broth to agar

			5.Fishing technique and isolation of mixed culture
	<b>Lab Practice (Lectures 5 &amp; 6)</b>		
<b>Week 5 9/25/2023</b>	<b>No Classes</b>		
<b>Week 6 10/2/2023</b>	<b>7</b>	<b>Laboratory Requirement for Bacterial Growth and the various Media used</b>	Requirements for bacterial growth in the lab and the various media used in bacterial isolation and identification with emphasis (Lab practice) on: 1.Blood agar 2.Chocolate agar 3.MacConkey agar
	<b>Lab Practice (Lecture 7)</b>		
	<b>UNKNOWN I (Lectures 1-6)</b>		
<b>Week 7 10/9/2023</b>	<b>8</b>	<b>Serial Dilution and Plate Count</b>	Criteria for the calculation of dilution factors along with the procedure of serial dilution and plate counting (Lab Practice)
	<b>9</b>	<b>Antimicrobial Susceptibility Testing</b>	Practicing the basic principles and interpretation of antimicrobial susceptibility testing. Lab practice of disk diffusion technique, MIC, MBC and E-Test.
	<b>Lab Practice (Lectures 8 &amp; 9)</b>		
<b>Week 8 10/16/2023</b>	<b>MIDTERM (PRACTICAL + WRITTEN; Lectures 1-9)</b>		
<b>Week 9 10/23/2023</b>	<b>10</b>	<b>Laboratory Identification of <i>Staphylococcus spp</i></b>	Practicing the steps followed in the identification of <i>Staphylococcus spp.</i> e.g.: 1. Catalase Test. 2. Coagulase Test 3. Mannitol Test 4. Novobiocin Test 5. D-test  The most commonly identified <i>Staphylococcus spp.</i> per site such as: 1. <i>S. saprophyticus</i> in urine samples 2. <i>S. aureus</i> and <i>S. epidermidis</i> in skin and wound swabs
	<b>Lab Practice (Lecture 10)</b>		
<b>Week 10 10/30/2023</b>	<b>11</b>	<b>Laboratory Identification of <i>Streptococcus</i> and <i>Enterococcus spp.</i></b>	Practicing the steps followed in the identification of <i>Streptococcus</i> and <i>Enterococcus spp.</i> e.g.: 1. Bacitracin Test 2. CAMP Test 3. Optochin Test

			<p>4. Bile Esculin Test 5. SF Test 6. VRE Test</p> <p>The most commonly identified <i>Streptococcus spp.</i> per site such as: 1. <i>S. agalactiae</i>, in vaginal swabs 2. <i>S. progenies</i> in throat swabs 3. <i>S. pneumoniae</i> in sputum swabs</p>
<b>Lab Practice (Lecture 11)</b>			
<b>Week 11 11/6/2023</b>	<b>12</b>	<b>Laboratory Identification of Neisseria, Moraxella catarrhalis and Acinetobacter spp.</b>	<p>Identification of Neisseria, Moraxella catarrhalis and Acinetobacter spp. the performance of: 1. Oxidase Test 2. DNase Test 3. Beta-Lactamase Test 4. CTA-Glucose/Maltose Tests</p> <p>The introduction to the most commonly identified organisms per site such as: 1. Neisseria spp. (vaginal swab, urethral swab) 2. Moraxella catarrhalis (nasopharyngeal aspirate) 3. Acinetobacter spp. (skin samples, wound swabs, pus swabs).</p>
<b>Lab Practice (Lecture 12)</b>			
<b>Week 12 11/13/2023</b>	<b>UNKNOWN II (Lectures 9-12)</b>		
<b>Week 13 11/20/2023</b>	<b>No Classes</b>		
<b>Week 14 11/27/2023</b>	<b>FINAL EXAM (PRACTICAL + WRITTEN; Lectures 9-12)</b>		

## Lab 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 and adhere to laboratory safety measures.
- **Cell phones:** cell phones are not allowed in class.
- **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](mailto: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, Mitra Tauk at 01-350000 ext. 2514, [titleix@aub.edu.lb](mailto:titleix@aub.edu.lb), report to a Title IX deputy at your faculty or at any other faculty ([www.aub.edu.lb/titleix](http://www.aub.edu.lb/titleix)), or report online ([www.aub.ethicspoint.com](http://www.aub.ethicspoint.com)). Reports may be submitted anonymously or not.