Course Plan: Physiology of Microorganisms

Instructor Information

Name: Dr. Milad Shahini

Degree: Ph.D. in Medical Bacteriology

Email: Shahini.m@skums.ac.ir

Class Time: 10:00-12:00

Class Days: Mondays and Wednesdays

Start Date: 07/04/2025

Department: Medical Bacteriology

Major: Master's Degree in Medical Microbiology

Credit: 2

Course Type: Theoretical

Main Objective

To provide a comprehensive understanding of the physiological mechanisms of microorganisms, with emphasis on bacterial structure, growth, metabolism, energy production, and regulatory systems.

Learning Outcomes

- Understand ecological roles and classification of microorganisms.
- Describe anatomical structures and functions of bacteria.
- Explain bacterial nutritional and physical requirements.
- Analyze mechanisms of bacterial metabolism and energy production.
- Understand regulatory systems including quorum sensing and metabolic control.

Student Evaluation and Weight

- Class Participation and Discussions: 3 marks

- Lab Reports and Practical Skills: 5 marks
- Midterm Exam: 6 marks
- Final Exam: 6 marks
- Total Marks: 20

References (Textbooks)

- Madigan M.T., Bender K.S., Buckley D.H., et al. “Brock Biology of Microorganisms.” Pearson.

- Prescott’s Microbiology. McGraw-Hill Education.

- Supplementary journal articles and lecture notes.

Course Schedule

Session	Date	Topic
1	2025/04/07	Introduction, History and Microbial Ecology
2	2025/04/09	Classification and Nomenclature Principles
3	2025/04/14	Bacterial Structure: Major Appendages
4	2025/04/16	Bacterial Structure: Minor Appendages
5	2025/04/21	Growth Physiology and Life Cycle
6	2025/04/23	Nutritional Requirements of Bacteria
7	2025/04/28	Physical Conditions for Growth
8	2025/04/30	Nutrient Uptake and Enzyme Secretion
9	2025/05/05	Transport Systems in Bacteria

10	2025/05/07	Key Metabolites in Biosynthesis
11	2025/05/12	Quorum Sensing and Signal Systems
12	2025/05/14	Metabolism, Energy, and Thermodynamics
13	2025/05/19	Fermentation Mechanisms
14	2025/05/21	Regulation of Metabolism
15	2025/05/26	Biosynthesis of Bacterial Components
16	2025/05/28	Sporulation and Germination