

Advanced bacteriology: MBIO 521

Course general Description:

Advanced Bacteriology is a graduate-level course designed for master's students in microbiology, focusing on the complex roles and mechanisms of bacteria in various environments. This course provides an in-depth exploration of bacterial physiology, genetics, and ecology, emphasizing their interactions with other microorganisms and their environments. Students will engage with contemporary diagnostic techniques and laboratory practices, enhancing their critical thinking and practical skills. Additionally, ethical considerations, sustainability, and the importance of diversity in scientific research will be addressed. Through lectures, hands-on laboratory experiences, and collaborative projects, students will develop the expertise necessary for advanced research and professional practice in bacteriology.

Course Main Objective(s):

1. Acquire students with advanced knowledge of bacterial physiology, genetics, and modern diagnostic techniques.
2. Prepare students to design and conduct independent, evidence-based research using specialized lab techniques and modern technologies.
3. Encourage students to demonstrate ethical integrity, promote sustainability in scientific practices, and cultivate leadership within a collaborative lab environment

Course Learning Outcomes

Knowledge and understanding

- ✓ Students will be able to demonstrate in-depth knowledge of the physiological, ecological, and genetic roles of bacteria, including their interactions with other microorganisms and their environments.
- ✓ Students will be able to critically appraise modern diagnostic methods for bacterial identification, assessing their reliability and applicability in clinical and research settings.

Skills

- ✓ Students will be able to develop expertise in the use of specialized instruments and techniques, such as genetic cloning and antimicrobial susceptibility testing, in the microbiology laboratory.
- ✓ Students will be able to independently execute and optimize laboratory protocols, effectively managing time and resources to ensure successful experimental outcomes.

Values, autonomy, and responsibility

- ✓ Students will be able to exhibit ethical integrity in research practices, promoting sustainability and inclusivity in bacteriology and broader scientific contexts.
- ✓ Students will be able to lead and mentor peers, fostering a supportive laboratory environment while ensuring safety protocols are upheld and sharing research findings responsibly with diverse communities.