

Institute of Microbiology and Molecular Genetics
Faculty of Life Sciences
University of the Punjab, Lahore
Course Outline



Programme	BS	Course Code	MMG204	Credit Hours	2
Course Title	BIO SAFETY, BIOSECURITY AND BIOETHICS				
COURSE INTRODUCTION					
<p>This course is designed to provide a comprehensive understanding of biosafety principles and practices essential for working in microbiology and molecular genetics laboratory settings. It covers a wide range of topics, from personnel and laboratory monitoring to the safe handling of biohazardous materials and regulatory compliance. The curriculum aims to equip students with the knowledge and skills necessary to maintain a safe and secure laboratory environment, protect public health, and navigate the ethical and legal aspects of biosafety.</p>					
LEARNING OUTCOMES					
<p>On the completion of the course, the students will:</p> <ol style="list-style-type: none"> 1. Demonstrate knowledge of various biohazards, the appropriate biosafety levels (BSL 1-4) and the equipment required to handle them safely. 2. Conduct comprehensive risk assessments for different laboratory environments and biohazardous materials. 3. Develop and implement effective waste management strategies to minimize biosafety risks. 4. Intellectual Property and Ethical Issues. 5. Apply theoretical knowledge in practical settings through competitions like designing and budgeting for a BSL-1 laboratory. 					
COURSE CONTENT					
<p>Introduction to Biosafety: Definition of Biosafety and Biosecurity, Personnel monitoring, laboratory monitoring, Product and environment biosafety. Biohazards: Introduction, Risk Groups, Risk Assessment, Biosafety level 1,2,3 and 4, Waste Management, Biosafety Manuals, Biosafety Cabinets, Biohazardous Material and their Transportation, pathogens and viral safety, radioactive elements and their handling, protection from carcinogenic elements. Bioethics: Safety regulations of GMOs. Transgenic crops and biopesticides. Uses and abuses of genetic information. Documentation. Intellectual property rights. Ethical, moral and religious issues regarding GMOs.</p> <p>ACTIVITIES Biosafety Awareness in University, Risk Assessment of given Area, Biosafety Labelling of Laboratory.</p> <p>COMPETITION BSL1 Design, Budget and Working: A Competition.</p>					
PRACTICALS					

TEXTBOOKS AND READING MATERIAL

1. World Health Organization. (2020). *Laboratory biosafety manual* (4th ed.). World Health Organization. <https://www.who.int/publications/i/item/9789240011311>.
2. Centers for Disease Control and Prevention, & National Institutes of Health. (n.d.). *Biosafety in microbiological and biomedical laboratories (BMBL)*. U.S. Department of Health and Human Services. <https://www.cdc.gov/labs/bmbl/index.html>
3. Kimman, T. G., Smit, E., & Klein, M. R. (2008). Evidence-based biosafety: A review of the principles and effectiveness of microbiological containment measures. *Clinical Microbiology Reviews*, 21(3), 403–425. <https://doi.org/10.1128/CMR.00014-08>. PMID: 18625678; PMCID: PMC2493080.

ASSESSMENT

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on activities, short tests, projects, practicals, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, fieldwork , report writing etc.