University of Management & Technology
School of Science
Department of Life Sciences

Industrial Microbiology (N1)

Lecture Schedule	Wednesday & Friday 14:00 - 15:15 & 17:00 - 18:15	**Semester**	Spring 2021
Pre-requisite	F.Sc. /A-level	**Credit Hours**	2+1
Instructor(s)	Mr. Ghadir Ali	**Contact** **Moodle link**	ghadir.ali@umt.edu.pk
Office	IHM Hall Cabin # 4	**Office Hours**	Displayed on office door & on Moodle

Objectives	• To learn about microorganisms of industrial importance. • To learn about the commercial utilization of microbes for the production of organic acids, organic solvents and fermentable products. • To learn the industrial microbial processing techniques.
Expected Outcomes	• Develop an understanding of role of microorganisms in the production of industrially important products • Understand and evaluate methods and approaches used to study culturing techniques of industrially important microbes • Explore the role of microbes in environmental quality and sanitation • Understand the principles and methods of microbial fermentations for organic acids, organic solvents and microbial enzymes
Lab Work	• Current techniques of industrial and applied microbiology with emphases on continuous cultures. • Immobilized cell techniques. • Study of different types of fermentations by different microorganisms. • Use of biotechnological techniques in fermentation of organic compounds.
Text book & Reference book(s)	1. Prescott S. C., 2007. Industrial Microbiology, Agrobios India 2. Naduka Okafor**.** 2007 Modern Industrial Microbiology and Biotechnology. Science Publisher. 3. Richard H. B. Julian E. D. et al., 2010. Manual of Industrial Microbiology and Biotechnology. ASM Press. 4. El-Mansi E. M. T. et al., 2011. Fermentation Microbiology and Biotechnology. CRC Press. 5. Pauline M. D., 2012. Bioprocessing Engineering Principles. Academic Press.
Grading Policy	Assignments: 05% Quizzes: 05% Discussion Forum 05% Midterm: 25%

	Final: Lab:	40% 20%

Course Schedule

Week	Lecture #	TOPICS
1	1 2	• Introduction to industrial Microbiology • History of industrial microbiology
2	1 2	• Isolation and screening • Primary and Secondary screening
3	1 2	• Production strains, Production media • Inoculum preparation and inoculum Development,
4	1 2	• Introduction to Fermenter • Industrial sterilization
5	1 2	• Scale up fermentations • Types of fermenters
6	1 2	• Environmental quality • And sanitation.
7	1 2	• The food processing, food manufacture, • Food preservation.
8	1 2	• Microbial fermentations: Organic acids –Citric acid • Lactic and acetic acid.
9		• Mid Term
10	1 2	• Organic solvents - Acetone • Butanol and ethanol
11	1 2	• Microbial enzymes - Amylases • Amino acids: Lysine and Glutamic acid.
12	1 2	• Production of single cell proteins • Production of yeast/ mushrooms
13	1 2	• Production of fermented foods • Production of microbial insecticides
14	1 2	• Production of Biopolymers • Biofuels
15	1 2	• Biogas • Scope of fermentation biotechnology In Pakistan.
16		• Final term