

St. Aloysius' College (Autonomous) Jabalpur, M.P.
 Department of Botany and Microbiology
B.Sc. I Semester Industrial Microbiology
Tools and techniques in Microbiology
Paper - Elective
Format for Syllabus of Theory Paper

Part A- Introduction			
Program: Certificate		Class: B.Sc.	Semester : I
Session: 2023-24			
Subject: Industrial Microbiology			
1	Course Code	S1INMB1T	
2	Course Title	Tools and Technique in Industrial Microbiology	
3	Course Type (Core Course/Elective/Generic Elective/Vocational/.....)	Elective	
4	Pre-requisite (If any)	To study this course, a student must have had the subject Biology in Class/12th/certificate/diploma.	
5	Course Learning Outcomes (CLO)	On completion of this course, the learners will CO 1- be able to understand the relevance of microscopic approaches in life sciences. CO 2- develop skills to understand concept and applications of instruments used in life sciences. CO 3- develop scientific understanding of analytical techniques CO 4- be able to interpret the results of an experiment CO 5- demonstrate use of different tools and different modern techniques in the field of Industrial Microbiology.	
6	Credit Values	3	
7	Total Marks	Max. Marks: 40+60	Min. Passing Marks: 35
Part B- Content of the Course			
Total No. of Lectures- Tutorials- Practical (in hours per week): 60 Hrs			
L-T-P:			
Unit	Topics		
1	Microscopy and Microscopic Techniques Principle and application of light microscopy, dark field microscopy, phase contrast microscopy,		

	fluorescence microscopy, confocal microscopy, Electron Microscopy, scanning & transmission electron microscopy, AFM Atomic Force Microscopy, Micrometry, Camera Lucida software in Microscopy
2	Spectrometry, Colorimetry, Turbidometry and Centrifugation <ul style="list-style-type: none"> ❖ Principle and use of absorption spectra of biomolecules. Their analysis using UV and visible range. ❖ Principle and use of colorimetry ❖ Principle and use of turbidometry ❖ Principle and types of analytical centrifugation, RCF and sedimentation co-efficient, ultra centrifugation and types of gradient ❖ pH meter, autoclave, hot air oven, incubator and BOD incubator and Laminar Air Flow.
3	Culture Techniques <ul style="list-style-type: none"> ❖ Culture media, preparation, types- define differential, selective and enrichment culture media ❖ Isolation techniques – pour plate, spread plate, streak plate, serial dilution method. ❖ Pure culture, enrichment culture and micromanipulator. ❖ Maintenance and preservation of pure microbial cultures. ❖ Lyophilization and cryopreservation.
4	Sterilization and Staining Techniques <ul style="list-style-type: none"> ❖ Sterilization – Principle & method of sterilization, physical and chemical agents of sterilization. ❖ Disinfectants, antiseptics, phenol coefficient ❖ Nature of dyes, physical and chemical theories of staining ❖ Principle, procedure and application of simple staining, negative staining, differential staining. ❖ Study of Aseptic techniques – preparation of cotton plugs for test tubes and pipettes, wrapping of petri plates and pipettes.
Keywords/Tags; Techniques, microscopy, chromatography, spectrophotometry, sterilization	
Part C- Learning Resources	
Text Books, Reference Books, Other resources	
Suggested Books: <ol style="list-style-type: none"> Tools & Techniques in Microbiology – Nath & Upadhyay Principles & Techniques of Biochemistry and Molecular Biology Cambridge University Press – Wilson & Walker J 2010 Hand book of techniques in microbiology AS Karwa, MK Rai, HB Singh (A Laboratory guide to microbes) Tools & Techniques of microbiology text book by Sundara S Rajan Hand book of microbiology – PS Bisen and Kavita Verma Practical Microbes A Laboratory Manual by B Senthil Kumar, Zothansganga, D Senbagam, N Senthil Kumar, G Gurusubramaniam (Paper Back – Kumar BS) <p>2. Suggestive digital platform web links</p>	
Suggested equivalent online courses: <p>http://nptel.ac.in/courses/104/104/104104066/ analytical methods</p> <p>http://nptel.ac.in/courses/102/107/102107028/ techniques tools</p>	

Part D – Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100

Continuous Comprehensive Evaluation (CCE): 40 marks University Exam (UE): 60 marks

Internal Assessment:	Class Test	15
Continuous Comprehensive Evaluation (CCE): 40	Assignment/Presentation	25
External Assessment:	Section (A): Objective type questions	Total : 60
University Exam Section: 60	Section (B): Short answer type questions	
Time – 02:00 Hours	Section (C): Long answer type questions	