

Title of the Course: TECHNIQUES AND INSTRUMENTATION IN MICROBIOLOGY [P]**Course Code: MIC-505****Number of Credits: 1, Practical****Contact hours: 30****Effective from Academic Year: 2022-23**

Prerequisites	The student should be familiar with the concepts of biochemistry and Microbiology.	
Objective:	This course develops the concepts of various techniques, methodology and instruments involved in studying the microbial cells and their products.	
Content:		(30)
1.	Analysis of the microbial cell structure using Phase contrast Microscopy.	
2.	Counting of bacterial cells using epifluorescence microscopy.	
3.	Cell disruption by sonicator and efficacy of sonication.	
4.	Density gradient separation of microbial cells.	
5.	Extraction of microbial pigments and profiling using UV-Vis spectroscopy.	
6.	Silica gel based adsorption chromatography for separation of pigments	
7.	Native Polyacrylamide gel electrophoresis (PAGE) for protein separation and Zymogram (Amylase or Protease).	
8	Demonstration of HPLC, FT-IR, GC and spectral analysis.	
Pedagogy:	Hands-on experiments in the laboratory, video, online data	
References/ Readings	Arora MP. Biophysics, Himalaya Publishing House, New Delhi (2020) Bajpai P.K. Biological Instrumentation & methodology, 2 nd revised edition, S.Chand and Co. (2010) Cooper, T. G., The Tools of Biochemistry, Wiley India Pvt. Ltd. Colowick, S. P. and Kaplan, N. O., Methods in Enzymology, Vol. VI, Academic Press, N.Y. (2013) Goswami, C., Paintal, A. and Narain, R., Handbook of Bioinstrumentation, Wisdom Press, New Delhi. (2011) Jayaraman, J., Laboratory Manual in Biochemistry, John Wiley & Sons Limited, Australia. (2011) Mahesh S. Biotechnology-3. Including Molecular Biology and Biophysics, New Age International Pvt. Ltd Publishers, New Delhi. (2018) Norris, J. R. and Ribbons, D. W., Methods in Microbiology, Volume 5, Part B, Academic Press. (1971) Parakhia, M. V., Tomar, R. S., Patel, S. and Golakiya, B. A., Molecular Biology and Biotechnology: Microbial Methods, New India, Pitampura. (2010) Sambrook, J., Fritsch, E. F. and Maniatis, T., Molecular Cloning: A	

	Laboratory Manual, Cold Spring Harbor Laboratory Press, USA. (2012)	
	Wilson, K. and Walker, J., Principles and Techniques of Biochemistry and Molecular Biology, Cambridge University Press, N.Y., USA. (2018)	
Course Outcomes	◆ Analyse the microbial cell structures. ◆ Examine the microbial metabolites and biomolecules. ◆ Develop various methods for the processing of microbial cells and their products. ◆ Interpret the activities of biomolecules.	