

Programme Name	Ph.D.	Programme Code	
Course Code	DSE704	Credit	4
Year/Sem	1/1	L-T-P	4-0-0
Course Name	Bio-Analytical & Microbial Techniques		
Objectives of the Course:			
<ol style="list-style-type: none"> To provide scientific and computational knowledge related to various techniques associated with biotechnology. To impart laboratory skills for handling analytical tools in industry and research institution. To give the scientific knowledge regarding safety regulations for handling of instruments in the laboratory and industry. To demonstrate the operating procedures associated with upstream and downstream process like chromatography, electrophoresis, centrifugation, etc. 			
UNIT I CHROMATOGRAPHY & CENTRIFUGATION ((Total Topics -10 and Hrs-10)			
General principle and application chromatography, Gas chromatography, Paper chromatography, Thin layer chromatography, HPLC (High Performance/Pressure Liquid chromatography). Centrifugation: Principle and application. Common centrifuges used in laboratory Types of rotors (fixed angle, swing bucket), Types of Centrifugation: Preparative, differential & density gradient.			
UNIT-II SPECTROSCOPY & MICROSCOPY (Total Topics -9 and Hrs-10)			
Spectroscopic methods: principle and applications of UV-visible, FTIR. Principle & application of X-ray crystallography. Basic knowledge of the principles and applications of Microscopy: Light, phase contrast, Fluorescence and Transmission Electron microscopy			
UNIT- III MICROBIOLOGICAL TECHNIQUES (Total Topics -8 and Hrs-10)			
Media preparation (Selective and differential), Sterilization techniques, isolation and maintenance of bacterial and fungi cultures, staining techniques, biochemical characterization, antimicrobial assay along with determination of MIC.			
UNIT-IV MOLECULAR TECHNIQUES (Total Topics -8 and Hrs-10)			
Electrophoresis- General principle and application electrophoresis, Agarose gel electrophoresis, SDS- PAGE, Blotting techniques. Working & application of RT-PCR, Gel DOC.			
Course Outcomes (COs):			
CO1. Development of scientific, computational and analytical knowledge regarding principle and application of advanced analytical techniques in the field of biotechnology and microbiology.			
CO2. Comprehension of microbial techniques and processes for isolation and screening of microbes isolated from different environment and sources.			
CO3. Exhibit skills to pertaining to analytical characterization of biological samples.			
CO4. Apply modern techniques and their statistical knowledge for solving various scientific problems in industry and research institution.			
References Books :			
<ol style="list-style-type: none"> Sharma, V.K., <i>Techniques in Microscopy and Cell Biology</i>, Tata McGraw Hill, 1991. Alberts, B., <i>Molecular Biology of the cell</i>, Garland, 1989, 2nd edition. Robyt, J.F. and White B.J., <i>Biochemical Technique: Theory & Practical</i>, Waveland Press, Inc. Wilson, K. and Walker, J., <i>Practical Biochemistry</i>, University of Hertfordshire Cambridge University Press, 4th edition. 			