**BIOTECHNOLOGY CREDIT HOURS 2+1**

**LEARNING OUTCOMES:**

**Students will be able to:**

1. About the conventional and modern biotechnology
2. How to apply these techniques in bioprocessing

**COURSE CONTENTS:**

Concepts, historical background, conventional and modern biotechnology: kinds of biotechnology, Plant biotechnology: plant tissue culture and GM Crops. Animal biotechnology; Environmental Biotechnology: Bioremediation. Biological control. Industrial biotechnology: fermentation techniques, bio products, (enzymes, amino acids etc). Medical biotechnology: diagnostic tools, health care products. Aquatic biotechnology: aqua culture, and sea food resources. Bioprocessing. Economic perspectives of biotechnology. Biotech COs and Bio Industries. Future challenges in biotechnology.

**PRACTICALS:**

1. Screening of lipase, protease, amaylase producing bacteria
2. Different aqua culture techniques
3. Plant/animal tissue culture technology
4. Bio degradation, toxic chemicals especially aromatics (pesticides & crude oil components)
5. Bio accumulation/Bio absorption of heavy metals by bacteria, fungi, protozoa, and plants.
6. Solubilization of insoluble metal complexes.
7. Production of bio polymers.

**RECOMMENDED BOOKS:**

1. Thiemann, W. J., Palladino, M. A., 2012; Introduction to biotechnology 3rd Ed, Benjamin Pearson publishers.
2. Khan, F. A. 2016. Biotechnology fundamentals. CRC Press, Taylor & Francis Group, CRC Press
3. Stevens, H. 2016. Biotechnology and society: An introduction . University of Chicago Press. Chicago.
4. Phillips, P. W. B., Castle, D., & Smyth, S. J. 2016. Biotechnology, agriculture and development. ACheltenham: Edward Elgar Publishing
5. Okafor, N. 2016. Modern Industrial Microbiology and Biotechnology. CRC Press