Programme: M.Sc. (Microbiology)

Course Code: MIO 116

Title of the Course: MICROBIAL TECHNOLOGY [T]

Number of Credits: 3

Effective from Academic Year: 2018-19

Prerequisites	It is assumed that students have a basic knowledge of different techniques in instrumentation- their principle and applications.	
Objective:	This course develops concepts in technologies used in agriculture, mining, energy production and human health with respect to microorganisms and genetically engineered microorganisms. Introduces concept of nanotechnology.	
Content:		
1.	**Biotechnology and prospecting with microbes.**	**(04)**
A.	Advantages of using microbial technology over chemical and physical technology.	
B.	Ethics in the use of GEMs.	
C.	Commercialization of Microbial Biotechnology.	
D.	Introduction to Nanotechnology.	
2.	**Microbial technology in agriculture**	**(08)**
	Production of microbial biofertilizers, biopesticides, soil conditioners to enhance crop yields.	
3.	**Microbial technology in mining**	**(12)**
A.	Bioleaching.	
B.	Biomining.	
C.	Recovery of oil. MEOR	
D.	Microbial technology in waste and pollution management in mining: Bioconversions, Bioremediation, Biosedimentation, Bio-beneficiation, Aquifer cleaning.	
4.	**Microbial technology for energy production**	**(07)**
A.	Microbial fuel cell.	
B.	Biogas.	
C.	Microbial cell mass.	
5.	**Microbial technology in Human health & aquaculture**	**(05)**
	Pigments, Nutraceuticals, Probiotics, Bioplastics, Microbes as bio-weapons.	
Pedagogy:	Lectures/tutorials/assignments/self-study	
References/ Readings	1. Arora, R., Microbial Biotechnology: Energy and Environment, CABI Publishing.	

	2. Ahmad, I., Ahmad, F. and Pichtel, J. Microbes and Microbial Technology: Agriculture and Environmental Applications, Springer. 3. Peppler, H.J., Microbial Technology: Microbial Processes, Academic Press. 4. Sukla, L. B., Pradhan, N., Panda, S. and Mishra, B. K. Environmental Microbial Biotechnology, Springer. 5. Bull, A. T., Microbial Diversity and Bioprospecting, American Society for Microbiology.	
Learning Outcomes	1. Apply the knowledge of various techniques in developing technology for sustainable development. 2. Explain commercialization of a technology.	