

B. Sc. Microbiology; Semester-I

Subject Title: Microbes in Waste to Wealth

Sub.Code:21BSC101MB1	Marks:60+40=100
Credits:03	Category:OEC1

Course Outcomes: The students completing the course will have the ability to

- Discuss issues related to recycling and resource recovery from wastes and wastewater
- Develop management plans for fly ash, plastic wastes ,agriculture waste,
- Recover biofuel from wastes and biomass

ModuleI	Introduction to Microbes	10hrs
	Properties, classification and Types, structure, organization and reproduction of prokaryotic and eukaryotic microorganisms. Functional role of microorganisms. Interactions with living and nonliving things, Biogeochemical cycles. Applications of Microorganisms in industry, food, Agriculture, environment and in Health.	
ModuleII	Introduction to Wastes	12hrs
	Problem of Wastes, Types of Solid Waste, Waste Characterization ,Source Reduction Solid Waste Reduction, Waste reduction strategies - Polluter Pays Principle (PPP), Assimilative Capacity and the Precautionary Principle, World Scenario in Scrap Trade Extended Producer Responsibility (EPR), Carrying Capacity, Precautionary Principle .Waste Reduction Towards Zero Waste Sustainable Living, Waste Reduction at Business (Producer) Level, Waste Reduction at Individual Level: Zero Waste Living, Waste Reduction at Community Level.	
Module III	Recycling of waste	10hrs
	Recycle and Reuse of Waste Re-use, General Process of Recycling, Precautions for Recycling –Aluminium, Glass, Precautions while Recycling of Plastics, Precautions while Recycling paper Amplifying benefits from waste	
Module IV	Agriculture Wastes Waste To Wealth	12hrs
	Types of organic and inorganic wastes Industrial, domestic, agriculture (vegetable, fruit, flower,), Plastic waste, hospital waste, construction waste, Mining waste, Animal, poultry, fishery, marine waste. Technologies for Converting Wastes from Crops/ Crop By-Products into High Value Products,Technologies for Converting Wastes from Horticultural Crops/Crop By-Products into High Value Products Processes/ Technologies for Converting Agricultural Wastes into Wealth Technologies for Converting Fisheries & Animal Wastes into High Value Products. Composting-Vermi composting	

Module V	Municipal solid waste ,Industrial waste to wealth	12hrs
Municipal Solid waste. Sources, domestic, industrial and Industrial wastes- Mineral wastes In dentification waste Minimizing options -Recovery and Recycle- Incineration Energy from waste- Pyrolysis, chemical processing- Legislative measures for garbage disposal. flyash - Nature- Direct Replacement of Cement- Waste Land Development- Soil Amendment to grow Crops- Utilization of Flyash In Afforestation, Limitation of Land Application of Fly Ash, Amount and types of plastic waste – Recycling of plastic waste- cement manufacture from industrial solid waste – Paper industry waste – Calcium carbide industry waste, textile industry waste, sugar industry waste, palm oil industry waste, Alcohol industry waste, Ecotourism.		

Text Books:

- Agarwal S.K. “Wealth from Waste”, Bhushannangia, APH Publishing Corporation, New Delhi, 2005
- Nemerow N.L., “Industrial Water Pollution”, Addison – Wesley Publishing Company inc., USA, 1978

References Books:

- Wesley Eckenfelder Jr. W, Industrial water pollution control, McGraw Hill book Co, New Delhi, 1989.
- Mahajan S.P. “Pollution Control in process industries”, Tata McGraw Hill Publishing Co Ltd., New Delhi, 1989.