

(iii)	Mycoviruses acting against fungal plant pathogens.	
(iv)	Integrated pest management, post harvest management, agri-entrepreneurship development (steps for starting small industry)	
<b>Pedagogy:</b>	Lectures/tutorials/assignments	
<b>References/Readings</b>	Agrios G.N. Plant Pathology. Academic Press, San Diego	
<b>(Latest edition)</b>	Alexander, M., Introduction to Soil Microbiology, Wiley.	
	Bilgrami K. S. (1987) Plant Microbe Interactions, Proceedings of Focal Theme Symposium, Indian Science Congress Association, Narendra Publishing House.	
	Carr, N. G. and Whitton, B. A., The Biology of Blue-green algae, University of California Press.	
	Dadarwal, K. R., Biotechnological Approaches in Soil microorganisms for sustainable crop production, Scientific Publishers.	
	Kumar, H. D., Modern Concepts of Microbiology, Vikas Publishing House Pvt. Ltd.	
	Madigan, M. T., Martinko, J. M., Bender, K. S., Buckley, D. H. and Stahl, D. A., Brock Biology of Microorganisms, Pearson Education Limited.	
	Mahanta, K. C., Fundamentals of Agricultural Microbiology, Oxford & IBH Publishers	
	Somani, L.L., Biofertilizers in Indian Agriculture, Concept Publishing Company.	
	Subba Rao, N.S., Biofertilizers in Agriculture and Forestry, International Science Publishers.	
	Subba Rao, N. S., Advances in Agricultural Microbiology, Oxford & IBH Publishers.	
	Veeresh, G. K. and Rajagopal, D., Applied Soil Biology and Ecology, Oxford & IBH Publishing Company Pvt. Limited.	
<b>Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. Apply the knowledge of soil chemistry and significant biochemical processes of microbes to improve agricultural practices.</li> <li>2. Apply the understanding of role of microorganisms in plant growth promotion and control of disease and pests.</li> </ol>	

**Programme: M.Sc. (Microbiology)**

**Course Code: MIPE-403**

**Title of the Course: AGRICULTURE MICROBIOLOGY [P]**

**Number of Credits: 1, Practical**

**Contact hours: 30**

**Effective from Academic Year: 2022-23**

<b>Prerequisites</b>	It is assumed that the student have knowledge about the soil properties and microbial interactions with plants.	
<b>Objective:</b>	Assessing the diverse parameters influencing the soil health. Studying the plant growth promoters and plant pathogens.	

<b>Content:</b>		<b>(30)</b>
1.	Isolation of plant growth promoting bacteria from rhizosphere and screening for phosphate/zinc solubilisation, IAA production, K mobilisation, siderophore activity and seedling vigour test.	
2.	Detection of microbial enzymes – amylase, phosphatase, lipase, protease, catalase, urease from various soils such as sandy soil and garden soil.	
3.	Isolation of microbial plant pathogen(s)-bacterial/fungal.	
4.	Preparation of biofertilizer using cyanobacteria	
<b>Pedagogy:</b>	Hands-on experiments in the laboratory, video, online data	
<b>References/Readings</b>	As given under Theory Course <b>MITE-403</b>	
<b>Learning Outcomes</b>	Integrate the knowledge of soil microorganisms for the betterment of agriculture.	

**Programme: M.Sc. (Microbiology)**

**Course Code: MITE-404**

**Title of the Course: MYCOLOGY [T]**

**Number of Credits: 3, Theory**

**Contact hours: 45**

**Effective from Academic Year: 2022-23**

<b>Prerequisites</b>	The student should be familiar with basic microbiology.	
<b>Objective:</b>	This course deals with classification and identification of fungi, fungal diversity, genetics and their applications.	
<b>Content:</b>		
<b>1.</b>	<b>Fungal diversity and distribution</b>	<b>(15)</b>
<b>1.1</b>	<b>Origin and phylogeny; classification</b>	
<b>1.2</b>	<b>Fungi – Terrestrial and Aquatic</b>	
A.	Terrestrial fungi; Aquatic Fungi: Fresh water fungi; Marine fungi: Coastal and Mangrove, Estuarine, Open Ocean, Polar regions.	
B.	Fungal diversity in Hypersaline waters – Thalassohaline and Athalassohaline: Solar salterns, Salt Lake, Dead Sea.	
<b>1.3</b>	<b>Extremophilic Fungi</b>	
	Oligotrophs, Alkaliphiles, Acidophiles, Barophiles, Psychrophiles, Thermophiles, Halophiles, Osmophiles, Xerophiles.	
	Fungal adaptation to extreme environments.	
<b>2.</b>	<b>Physiology and Genetics</b>	<b>(15)</b>
<b>2.1</b>	<b>Physiology of fungi</b>	
A.	Growth and development.	
B.	Fungal hormones- attractants, morphogenesis and differentiation.	
C.	Microbial interactions.	
D.	Secondary metabolites: antimicrobials, mycotoxin, pigments.	
<b>2.2</b>	<b>Fungal genetics</b>	
	<i>Neurospora</i> and <i>Saccharomyces</i> : Life-cycle; Tetrad analysis, gene conversion; Deuteromycotina: parasexuality, cytoplasmic inheritance; Electrophoretic karyotyping.	
<b>2.3</b>	<b>Identification of fungi</b>	