Programme: M.Sc. (Microbiology)

Course Code: MIC 204

Title of the Course: MYCOLOGY

Number of Credits: 3

Effective from Academic Year: 2018-19

Prerequisites	The student should be familiar with the structural morphology of the fungus and their existence in the surrounding environment.	
Objective:	This course deals with detailed classification and identification of fungi, fungal ecology in terrestrial, aquatic and extreme habitats, fungal genetics and applications of fungal enzymes and various primary and secondary metabolites.	
Content:		
1.	**Fungal diversity and distribution**	**(12)**
1.1	**Origin and phylogeny**; **classification**	
1.2	**Fungi – Terrestrial and Aquatic**	
A.	Terrestrial, Fresh water and Marine: Coastal – mangrove; Estuarine; Ocean	
B.	Hypersaline waters – Thalassohaline and Athallasohaline: Solar salterns, Salt Lake, Dead Sea.	
1.3	**Extremophilic Fungi**	
	Oligotrophs, Alkaliphiles, Acidophiles, Barophiles, Psychrophiles, Thermophiles, Halophiles, Osmophiles, Xerophiles.	
	Adaptation to extreme environments.	
2.	**Physiology and Genetics**	**(12)**
2.1	**Physiology of fungi**	
A.	Growth and development.	
B.	Fungal hormones- attractants, morphogenesis and differentiation.	
C.	Microbial interactions.	
D.	Secondary metabolites: antimicrobials, mycotoxin, pigments.	
2.2	**Fungal genetics**	
	Neurospora and *Saccharomyces*: Life-cycle; Tetrad analysis, gene conversion; Deuteromycotina: parasexuality, cytoplasmic inheritance; Electrophoretic karyotyping.	
2.3	**Identification of fungi**	
A.	Colonial and morphological characteristics.	
B.	Molecular finger printing.	
3.	**Pathogenesis - Antifungal Therapy**	**(04)**
3.1	**Pathogenesis**	
A. B.	Mycoses - Systemic, sub-cutaneous, cutaneous and superficial, opportunistic	

	Plant pathogens.	
3.2	**Antifungal Therapy**	
	Drugs acting on cell membrane, protein synthesis inhibitors; fungicides.	
4.	**Applications**	**(08)**
A.	Industrially important enzymes.	
B.	Bioprospecting of secondary metabolites: Antimicrobials, antitumour agents, nutraceuticals, pigments,.	
C.	Biodegradation and bioremediation.	
D.	Biocontrol.	
Pedagogy:	Lectures/tutorials/assignments/self-study	
References/ Readings	Alexopoulus, C. J., Mims, C. W. and Blackwell, M., Introductory Mycology, John Wiley & Sons (Asia) Pvt. Ltd.	
	Mehrotra, R. S. and Aneja, K. R., An Introduction to Mycology, Wiley Eastern Limited.	
	Cooke, R. C. and Whipps, J. M., Ecophysiology of fungi, Blackwell Scientific Publications, Oxford.	
	Deacon, J. W., Introduction to Modern Mycology, Volume 7 of Basic Microbiology, Blackwell Scientific Publications.	
	Kendrick, B., The Fifth Kingdom, Focus Publishers.	
	Davis, B. D., Dulbecco, R., Eisen, H. N. and Ginsberg, H. S., Microbiology, Harper and Row.	
	Strickberger, M. W., Genetic, The MacMillan Company, New York.	
	Domsch, K. H., Gams, W. and Anderson, T-H., Compendium of Soil Fungi, IHW-Verlag.	
	Gilman, J. C. and Joseph, C., A Manual of Soil Fungi, Daya Books.	
	Onions, A. H. S., Allsop, D. and Eggins, M. O. W., Smith's Introduction to Industrial Mycology, Edward Arnold, London.	
Learning Outcomes	Apply the knowledge in fungal taxonomy, bioremediation and bioprospecting of secondary metabolites and industrially important fungal enzymes.	