

Programme: M.Sc. (Microbiology)

Course Code: MIC 103

Title of the Course: MICROBIAL TAXONOMY AND SYSTEMATICS

Number of Credits: 3

Effective from Academic Year: 2018-19

Prerequisites	It is assumed that students should have a basic understanding of binomial nomenclature, the basis of classification systems and be familiar with the distinguishing features of different groups of microorganisms.	
Objective:	This course introduces the development of taxonomy and systematics, the various characters used for this purpose, the rules governing the different taxonomy and classification systems and the salient features of the different microbial groups. It also focuses on the rapidly evolving nature of taxonomy and systematics.	
Content:		
1.		
1.1	Microbial taxonomy and systematics Concepts of taxonomy (characterization, classification and nomenclature) and systematics; classification of microorganisms, three domain, six-kingdom, 8-kingdom systems.	(02)
1.2	Phenotypic characters - Morphology, Biochemical tests (e.g. API, BIOLOG), Bacteriophage typing, Serotyping.	(04)
1.3	Chemotaxonomic markers - Cell wall components, lipid composition, cellular fatty acid (FAME analysis), isoprenoid quinones, protein profiles (e.g. MALDI-TOF).	(06)
1.4	Nucleic acid based techniques – Terminal Restriction Fragment Length Polymorphism (TRFLP); G+C content (T_m and HPLC); pyrosequencing; 16S rRNA gene sequencing; phylogenetic analysis; DNA-DNA hybridization.	(08)
1.5	Concepts of species, numerical taxonomy and polyphasic taxonomy.	(04)
2.	Salient features of phylum, class and orders with representative examples of the following – Archaea, Eubacteria (bacteria, cyanobacteria, actinomycetes), Mycota, Protista (algae, protozoa, diatoms); and viruses.	(12)
Pedagogy:	Lectures/tutorials/assignments/self-study	
References/Readings	Sneath, A. H. P., Mair, S. N. and Sharpe, E. M., Bergey's Manual of Systematic Bacteriology Vol. 2. Williams & Wilkins Bacteriology Symposium, Series No 2, Academic Press, London/New York.	

	Goodfellow, M., Mordarski, M. and Williams, S. T., The biology of the actinomycetes, Academic Press.	
	Goodfellow, M. and Minnikin, D. E., Chemical Methods in Bacterial Systematics, The Society for Applied Bacteriology. Technical Series No. 20, Academic Press.	
	Barlow, A., The prokaryotes: A Handbook on the Biology of Bacteria: Ecophysiology, Isolation, Identification, Applications, Volume 1, Springer-Verlag.	
	Kurtzman, C. P., Fell, J. W. and Boekhout, T., The Yeasts - A Taxonomic Study, Elsevier.	
	Prescott, L. M., Harley, J. P. and Klein, D.A., Microbiology. McGraw Hill, New York.	
	Norris, J. R. and Ribbons, D. W., Methods in Microbiology, Vol. 18 & 19, Academic Press.	
	Reddy, C. A., Methods for General and Molecular Microbiology, ASM Press.	
Learning Outcomes	1. Apply knowledge of the standard rules of classification systems to categorize microorganisms. 2. Appreciate and explain the dynamic and ever developing nature of the field of microbial taxonomy and systematics.	