

Semester	5 and 6		
Course Code:	MIBI 43764		
Course Name:	Advanced study on selected taxonomic groups of Bacteria and Archaea, Applied Virology and Applied Mycology		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	Theory	Practical	Independent Learning
	60 hrs	-	140 hrs
Course Aim/Intended Learning Outcomes:			
Upon successful completion of this course student will be able to;			
<ul style="list-style-type: none"> • Discuss the taxonomic importance of selected bacterial groups, • Recognize the importance of bacteriophages and bacteriophage-based techniques in controlling bacterial pathogens, • Discuss the strategies used to develop viral vaccines, viral vectors and oncolytic viruses and • Demonstrate the understanding on the applications of fungi and their secondary metabolites in various biotechnological aspects. 			
Course Content:			
Advanced study on selected taxonomic groups of Bacteria and Archaea:			
<i>Archaea:</i> Biology of Archaea – characteristic features, Classification and phylogeny, Archaeal diversity, Specific features of archaea that make them capable of living in different extreme environments of acidity, salinity and temperature.			
<i>Studies on other selected bacterial groups:</i> Biology, classification and diversity of selected bacterial groups - Lactic acid bacteria, Actinomycetes, Intra cellular bacterial pathogens, <i>Pseudomonas</i> and spore-forming bacteria			
Viral genetics and their applications:			
<i>Bacteriophage genetics and their applications:</i> phage-based vectors, phage-host arms race, Bacterial resistance mechanisms and their applications in molecular biology (including CRISPR-CAS systems and their applications ex: genome editing), Use of phage-based methods for bacterial biocontrolling in agricultural, industrial and medical fields. <i>Viral vaccines and viral vectors:</i> Molecular approaches in developing of viral vaccines. Viral vectors and gene therapy. <i>Oncolytic virotherapy:</i> strategies used to develop oncolytic viruses and advantages of oncolytic virotherapy.			
Applied Mycology:			
<i>Strain improvement of filamentous fungi:</i> considerations in strain improvement, genetic engineering approaches, post-translational effects, physiology and productivity, genome-wide and proteomic approaches. <i>Fungal biosorption:</i> Fungal biosorbents, Advantages of using fungal biosorbents, Mechanisms of fungal biosorption and factors influencing the process. <i>Fungal chitinases:</i> current advances. <i>Other applications of fungi and fungi-based products:</i> Applications in agriculture, food industry, medicine and ecology.			
Teaching /Learning Methods: Lectures, assignments, group presentations and research paper discussions			
Assessment Strategy: Continuous assessment and end of the course unit examination.			
Continuous Assessment		Final Assessment	
10%		90%	
Details:		Theory (%)	Practical (%)
Assignments: 10%		90	-
			Other (%)
			-
Recommended Reading:			
<ul style="list-style-type: none"> • Madigan, M.T., Martinko, J.M., Bender, K.S., Buckley, D.H., and Stahl, D.A. (2015) <i>Brock Biology of Microorganisms</i>. 15th edition. Pearson Education Inc. • Tortora, G.J., Funke, B.R. and Case, C.L. (2010) <i>Microbiology: An Introduction</i>. 10th Edition. Pearson Education, Inc. • Kutter, E. and Sulakvelidze, A. (2004) <i>Bacteriophages: Biology and Applications</i>. 1st Ed. CRC Press. • Marintcheva, B. (2017) <i>Harnessing the Power of Viruses</i>. 1st Ed. Academic Press. • Kavanagh, K. (2005) <i>Fungi: biology and applications</i>. 3rd Ed. Wiley Blackwell. • Brige, P.D. and Rai, M. (2009) <i>Applied mycology</i>. CABI International. • Related current review and research articles in peer-reviewed journals as recommended by the lecturers. 			