M.Sc. III Semester, Advanced Microbial Physiology, LS 505, 2 credit

Course coordinator: Prof. Atul Kumar Johri (AKJ)

Participating faculty: Dr. Sneh Lata Panwar (SLP), Dr. Vikas Yadav (VY)

S. No	Topics	Contact hours and faculty
	Physiology of growth: Growth kinetics. Regulation. Effect of environmental factors on growth e.g., pH, Temperature, Oxygen, Nutrient limitations etc.	(3)AKJ
	Host Microbe Interaction: Biochemical, Physiological, Genetic aspects of symbionts. Physiological and Molecular Biology of Symbiosis. Molecular taxonomy of microorganisms	(3) SLP
	Advanced Bacterial Metabolism: Recent Advances in bacterial metabolism will be covered with emphasis on unusual bacterial pathways.	(4)VY and SLP
	Stressors, Stress reactions and Survival of bacteria: Prokaryotic responses to Environmental stress: Heat shock and molecular chaperones. Oxidative stress, Hydrostatic stress. Osmotic shock, cross responses to stress factors.	(3)VY
	Quorum sensing in bacteria: Gram negative bacteria: LUXI LUXR-Type: Gram positive bacteria: Peptide mediated quorum sensing.	(3)SLP
	Signal transduction: Mechanisms in bacteria with special emphasis on bacterial development and cell cycle control.	(3) VY
	Industrial Microbiology: The application of fundamental principles of Microbiology to industrial Fermentations and processing. Antibiotics production etc.	(2) AKJ
	Environmental Microbiology: Microbial degradation of xenobiotics. Catabolic genes and their regulation, Biomaterials, Isolation, Production, Characterization	(3)AKJ

	and its use.	
	Physiology and vaccine development: Use of proteomics and genomics and physiology for the development of vaccine of specific microorganisms.	**(4) AKJ**
	Interactions between Humans and microorganisms: Nonspecific and specific defense mechanisms. Mechanisms of pathogenesis. Host factors influencing resistance to infection.	**(4) AKJ and VY**

Suggested reading:

1. Microbiology, J.G. Cappuccino, N. Sherman, Pearson Education Publications
2. Essential Microbiology, Stuart Hogg, John Wiley and Sons Limited
3. Microbiology: A Human perspective, E.W. Nester, D.G. Anderson, C.E. Roberts, N.N Pearsall, M.T. Nester Mc Graw Hill Higher Education.
4. Manual of Environmental Microbiology, C.J. Hurst, R.L. Crawford, G.R. Knudsen, M.J. Mclnerney, L.D Stetzenbach., ASM Press.
5. Microbiology, L.M. Presscott, J.P. Harley, D.A. Klein, Mc Graw Hill International Edition
6. General Microbiology, H.G. Schlegel, Cambridge University Press.