Optional Course

LS 505—ADVANCED MICROBIAL PHYSIOLOGY [2 credits]

AK Johri*, J Paul, Sneh Lata Panwar

S No	Topic	Contact Hours
1.	Host Microbe Interaction: Biochemical. Physiological. Genetic aspects of symbionts. Physiology and Molecular Biology of Symbiosis. Molecular taxonomy of microorganisms	
2.	Advanced Bacterial Metabolism: Recent Advances in bacterial metabolism will be covered with emphasis on unusual bacterial pathways	
3.	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	
4.	Quorum sensing in Bacteria: Gram negative bacteria: LUXI LUXR-Type: Gram Positive bacteria: Peptide mediated quorum sensing	
5.	Signal Transduction: Mechanisms in bacteria with special emphasis on Caulobacter development and cell cycle control	
6.	Interactions between Humans and microorganisms: Nonspecific and specific defense mechanisms. Mechanisms of pathogenesis. host factors influencing resistance to infection	
7.	Physiology of growth: Growth kinetics. Regulation. Effect of environmental factors on growth e.g., pH. Temperature. Oxygen. Nutrient limitations etc	
8.	Physiology and vaccine development: Use of proteomics and genomics and physiology for the development of vaccine of specific microorganisms	
9.	Environmental Microbiology: Microbial degradation of xenobiotics. Catabolic genes and their regulation. Biomaterials. Isolation. Production. Characterization and its use	
10.	Industrial Microbiology: The application of fundamental principles of Microbiology to industrial Fermentations and processing. Antibiotics production etc	

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 McGraw Hill Higher Education

4. Manual of Environmental Microbiology, C. J. Hurst, R.L. Crawford, G.R.Knudsen, M.J. McInerney, L.D. Stetzenbach,, ASM Press.
5. Microbiology, L.M. Prescott, J. P. Harley, D.A., Klein, McGraw Hill, International Edition
6. General Microbiology. H.G. Schlegel, Cambridge University Press