

509
 Course: Microbial Physiology, Credit: 2, LS 505 M.Sc. III Semester
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S. No	Topic	Contact hours/faculty
1	Microbial growth and nutrition: Nutrient's uptake into cells, concepts of media design, cultivation and isolation of microorganisms by enrichment, Effect of nutrients and environmental factors on growth rate, manipulation of microbial growth for human welfare purposes	4 (AKJ)
2	Microbial metabolism: Biosynthesis and degradation of biomolecules involving metabolic pathways to maintain microbial structural integrity and its functioning. Understanding of metabolomics and metabolic engineering in context human welfare	3 (VY)
3	Soil Microbiology and Biogeochemical cycles: Carbon, nitrogen sulphur and phosphorus cycle, nitrogen fixation and its role in crop improvement, Microbial mat communities and biofilms, biomass and biomarkers	3 (VY)
4	Microbial physiology in context of environment: Genetic and metabolic engineering of microorganisms for improved biodegradation and detoxification of toxic and recalcitrant compounds.	2 (AKJ)
5	Fermentation Technology: Exploitation of microbial metabolism in food technology, distilleries, enzymes, antibiotics and antimicrobial secondary metabolite and alternative energy sources etc..	4 (AKJ)
6	Microbe-microbe interaction: Positive and negative interactions, competition, synergism, commensalism, understanding of microbial immunity in context of CRISPR/Cas system, microbial toxins	3 (SLP)
7	Beneficial symbiotic associations: Establishment of symbiosis, protection, types of symbiosis, microbe-plant symbiosis, microbe-animal symbiosis	4 (SLP)
8	Human-microbe Interaction: Human microbiome, pathogenesis mechanisms, innate host defences, adherence and penetration, colonization, virulence factors.	3 (AKJ)
9	Viruses: Origin of viruses, viral restriction and modifications, viral diseases of humans, viral infections and mechanism of action	3 (AKJ)
10	Vaccines: Use of bioinformatics, genomics and proteomics for the vaccine development against important human pathogens: fungal, bacteria and viruses	3 (AKJ)

Course coordinator: *Prof. Atul Kumar Johri (AKJ), Dr. Sneh Lata Panwar (SLP), Dr. Vikas Yadav (VY)

Books: Microbial life: Perry, Staley and Lory

Microbiology An Introduction: Tortora, Funke and Case

AKJ
 SLP
 Vikas Yadav
 (SNEH LATA PANWAR)