

COURSE TITLE:

MICROBIAL ECOLOGY

COURSE DESCRIPTION:

Introduction to microbial ecology. Strain, population, guild, community, ecosystem.

Metabolic diversity of microorganisms. Chemotrophy and phototrophy, lithotrophy and organotrophy, autotrophy and heterotrophy, mixotrophy.

Cultivation based and cultivation independent methods in analyses of microbial communities. Measuring microbial activities in nature.

Traditional (typological, morphological, biological, evolutionary, phylogenetic) concept of species. Species concept for prokaryotes. Microbial speciation.

Biogeochemical cycle of carbon. Carbon reservoirs. Photosynthesis and decomposition. Methanogenesis and syntrophy.

Biogeochemical cycle of nitrogen. Nitrogen fixation, nitrification, assimilatory and dissimilatory reduction of nitrate, anaerobic ammonia oxidation.

Biogeochemical cycle of sulfur. Aerobic and anaerobic oxidation of sulfide and sulfur, assimilatory and dissimilatory reduction of sulfate, desulfurilation.

Microbes in nature. Microbes and microenvironment, microbes and macroenvironment. Biofilms. Quorum sensing.

Freshwater microbiology. Microbiology of terrestrial environments.

Microorganisms in extreme environments. Deep-sea microbiology, hydrothermal vents.

Interactions between microorganisms. Virus – bacterium relations.

Plants as microbial habitats. The legume–root nodule symbiosis.

Animal microbial interactions. Insects and mammals as microbial habitats. Human microbiome project.

LITERATURE:

McArthur JV: Microbial Ecology. An Evolutionary Approach. Elsevier Academic Press, Oxford, 2006. ISBN-13: 978-0-12-369491-1

Barton LL, Northup DE: Microbial Ecology. Wiley & Blackwell, 2011. ISBN 978-0-470-04817-7

Madigan MT, Martinko JM, Stahl DA, Clark DP: Brock Biology of Microorganisms. Pearson Education, San Francisco, USA, 2012. ISBN-13: 978-0-321-64963-8

TEACHER:

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