MANGALORE UNIVERSITY

Department of Microbiology

M.Sc. Microbiology

MBS-458: Geomicrobiology

40h

OBJECTIVES

1. To study various types of soil available on earth and their significance.
2. To understand role of microbes in various global cycles in the mineralization and assimilation of metals.
3. Role of microbes in solid waste treatment, degradation of toxic molecules and bioremediation technology in pollution management.

COURSE OUTCOME

CO1: Implementation of Bioleaching process in the extraction of gold, silver, copper etc.
CO2: Understanding role of microbes in petroleum product formation.
CO3: Employability in environmental boards.
Co4: Understanding importance of microbial activity in agriculture.

Unit I

Horizons of soil, Microorganisms in different soil horizons, Classification of microorganisms. Molecular approaches to study microbial diversity, Role of Microbes in Geochemical cycling of Carbon, Nitrogen, Sulfur and Phosphorus. Studies on extremophiles in different geological spheres, Microorganisms in aquatic ecosystem and their role. Role of microbes in weathering of rocks, Lichens, the events that led to the emergence of life, evolution of metabolic processes, and the diversification of the biosphere.

UnitII **13h**

Role of microbes in organic solid waste treatment, subterranean microbes. Biodegradation: Role of microbes in degradation, Biodegradation of Xenobiotics, hydrocarbons, pesticides and plastics. Biodeterioration of wood, pulp and paper; Biosorption/bioaccumulation of heavy metals. Bioremediation of soil, air and water: various methods, advantages and disadvantages, composting. N_2fixing Microbes and Phosphate solubilizing microorganisms.

Unit III **13h**

Bioleaching of iron, copper, gold and uranium, Chemical reactivity of the cell surface, metal sorption, microbiological mineral formation and fossilization. Diversity in anoxic eco system. Methanogens-reduction of carbon monoxide- reduction of iron, sulphur, manganese, nitrate and oxygen. Geomicrobiology of fossil fuel, peat, coal and petroleum. Removal and Disposal of Heavy Metals and Pollutants. **Note: Unit I: 14h, Unit II & III for 13h**