COURSE CODE: MCB 303
COURSE TITLE: Soil Microbiology
NUMBER OF UNITS: 3 Units
COURSE DURATION: Three hours per week

COURSE DETAILS:

Course Coordinator: Dr. Akintokun, A.K. Bsc.,Msc., PhD
Email: ron_akintokun@yahoo.com
Office Location: Room A212, COLNAS
Other Lecturers: Dr. Balogun, S.A and Dr. Obuotor, T

COURSE CONTENT:

- Characteristics of the soil environment
- Microflora and fauna of soil
- Microbial activities in soil: Nitrogen, Carbon, and Sulphur cycle
- Mineral transformation by microorganisms
- Organic matter decomposition
- Ecological relationships among the soil pathogens
- Effects of pesticides on soil microorganisms
- Biodegradation of pesticides
- Biofuels generation
- Techniques in soil microbiology

COURSE REQUIREMENTS:

- This is a compulsory course for all microbiology students . The students are expected to attend classes and practical sessions

READING LIST:

- 1. Gillings, M. And Holmes, A. Plant Microbiology.
- 2. Simon Baker, Jane Nicklin, Naveed Khan and Richard Killington.Instant Notes microbiology
- 3. Agrawal/ Parihar. Industrrial Microbiology Fundamental and Application.
- 4. R.C. Dubey and D.K. Maheswari. A textbook of Microbiology. S.Chand & Company LTD

LECTURE NOTES

- What is soil?

Soil is the outer region of earth crust consisting of loose material formed by gradual weathering of rock and gives to plant both mechanical and nutritional support

Characteristics of soil environment

- Soil texture--- Sand, Silt and clay particles
- Water
- Air
- Inorganic chemicals
- Organic matter

Microflora and fauna of soil

- Soil algae
- Bacteria
- Actinomycetes
- Protozoa
- Nematodes
- Fungi

Microbial activities in soil

- Nitrogen cycle:
- Nitrogen is an essential constituent of proteins and chlorophyll of plants and microorganisms
- Found in highest concentration (79%) in the atmosphere but found inlimited amount in the soil
- The key processes of nitrogen cycle are:
- Nitrogen fixation
- Ammonification
- Nitrification
- Denitrification
- Nitrite ammonification
- Carbon cycle
- Living matter is composed of carbon
- Carbondioxide is the main source of carbon required to build the organic world
- Carbon cycle involve photosynthesis, plant, animal and microbial respiration.
- Sulphur cycle
- Sulphur is an essential nutrient of plant and animals. It is abundant in the earth crust in low concentration and unavailable to plants.
- In soil sulphur enters in the form of plant residues, animal wastes, chemical fertilizers and rain water.
- In is taken up by plant roots as sulfate ions which is required for the growth and development of plants. It is found in the excretory products of animals as free sulfate, thiosulfate, taurine and thiocyanate. It occurs in plant, animal and microbial proteins in the amino acids, cystine, methionine and vitamins as biotin and lipoic acid.
- Microbial metabolisms of sulphur include decomposition, assimilation/immobilization, oxidation and reduction of sulphur compounds.