

THOMAS ADEWUMI UNIVERSITY OKO		
COURSE OUTLINE		
Faculty	COMPUTING AND APPLIED SCIENCES	
Department	BIOLOGICAL SCIENCES	
Course title	SOIL MICROBIOLOGY	
Year of study	4	
Course code	MCB 411	
Credit hours	2	
Contact hours	30	
Mode of delivery	CLASSROOM LECTURES	
Mode of assessment		WEIGHT%
Continuous assessment		30%
Final examination		70%
Total		100%
Course lecturers and Instructors	MR. BAMIDELE OLADAPO –LECTURER	
Course description	Soil microbiology is the study of microorganisms living within the soil environment. It encompasses the examination of various types of microorganisms, including bacteria, fungi, archaea, viruses, and protozoa, as well as their interactions and functions within the soil ecosystem. This field plays a crucial role in understanding how microorganisms contribute to soil fertility, ecosystem, and the overall health of our planet.	
Course objectives	<p>This course will make it possible to understand</p> <ol style="list-style-type: none"> 1. Diversity of microorganisms present in soil ecosystems, including bacteria, fungi, archaea, and other microbial life forms. 2. The vital roles soil microorganisms play in nutrient cycling, organic matter decomposition, carbon sequestration, and the overall health of soil ecosystems. 3. The intricate interactions between soil microorganisms and plants, highlighting symbiotic relationships, pathogenesis, and their impact on plant growth and health. 4. The influence of soil microorganisms on environmental factors such as soil structure, water retention, and greenhouse gas emissions. 5. The practical applications of soil microbiology in agriculture, bioremediation, waste management, and sustainable land use practices. 	

	<ol style="list-style-type: none"> 6. The effect of xenobiotic materials on soil microbe and their metabolic activities 7. The challenges posed by soil degradation, pollution, and climate change, and how soil microbiology can contribute to solutions.
Learning outcomes	<p>By the end of the course, students will be able to:</p> <ol style="list-style-type: none"> 1. Understand and describe diversity of microorganisms present in soil ecosystems, including bacteria, fungi, archaea, and other microbial life forms. 2. Explain the roles of soil microorganisms in nutrient cycling, organic matter decomposition, carbon sequestration, and the overall health of soil ecosystems. 3. Describe the intricate interactions between soil microorganisms and plants, highlighting symbiotic relationships, pathogenesis, and their impact on plant growth and health. 4. Outline the influence of soil microorganisms on environmental factors such as soil structure, water retention, and greenhouse gas emissions. 5. Know the practical applications of soil microbiology in agriculture, bioremediation, waste management, and sustainable land use practices. 6. Explain the effect of xenobiotic materials on soil microbe and their metabolic activities 7. Describe the challenges posed by soil degradation, pollution, and climate change, and how soil microbiology can contribute to solutions.
Teaching and learning	The class will meet for two hours a week.
Detailed course content	The characteristics of soil environment; microbial flora and fauna of soil; microbial activities in soil; Nitrogen cycle, mineral transformation by micro-organisms. Ecological relationship among soil pathogens. Effects of pesticides on soil micro-organisms. Biodegradation and biofuels generation. Microbiology of the rhizosphere.
Course content sequencing	
Weeks	

Week 1	The characteristics of soil environment
Week 2 – 3	Microbial flora and fauna of soil
Week 4	Continuous Assessment 1
Week 5	Microbial activities in soil; Nitrogen cycle, mineral transformation by micro-organisms
Week 6	Ecological relationship among soil pathogens
Week 7	Effects of pesticides on soil micro-organisms.
Week 8	Microbial Bioremediation
Week 9	Continuous Assessment 2
Week 10	Biodegradation and biofuels generation
Week 11	Microbiology of the rhizosphere
Week 12	Revision
Recommended reading material	
<ol style="list-style-type: none"> 1. Joanne Willey and Kathleen Sandman and Dorothy Wood (2020). Prescott's Microbiology. McGraw-Hill Higher Education 2. Michael T. Madigan, Kelly S. Bender, Daniel H. Buckley W. Matthew Sattley and David A. Stahl (2019). Brock Biology of Microorganisms. Pearson Educational Limited 3. Jack Dirk van Elsas, Jack T. Trevors, Alexandre Soares Rosado, and Paolo Nannipieri (2019). Modern Soil Microbiology. CRC Press. 	

Course code: MCB 411

Course title: SOIL MICROBIOLOGY

Preamble: Soil microbiology is the study of microorganisms living within the soil environment. It encompasses the examination of various types of microorganisms, including bacteria, fungi, archaea, viruses, and protozoa, as well as their interactions and functions within the soil ecosystem. This field plays a crucial role in understanding how microorganisms contribute to soil fertility, ecosystem, and the overall health of our planet.

Specific course objectives/learning outcomes.

The course will enable the understanding of the following:

1. Diversity of microorganisms present in soil ecosystems, including bacteria, fungi, archaea, and other microbial life forms.
2. The vital roles soil microorganisms play in nutrient cycling, organic matter decomposition, carbon sequestration, and the overall health of soil ecosystems.

3. The intricate interactions between soil microorganisms and plants, highlighting symbiotic relationships, pathogenesis, and their impact on plant growth and health.
4. The influence of soil microorganisms on environmental factors such as soil structure, water retention, and greenhouse gas emissions.
5. The practical applications of soil microbiology in agriculture, bioremediation, waste management, and sustainable land use practices.
6. The effect of xenobiotic materials on soil microbe and their metabolic activities
7. The challenges posed by soil degradation, pollution, and climate change, and how soil microbiology can contribute to solutions.

Learning activities/Course delivery methods

1. Lectures: detailed content of course are taught in class
2. Laboratory Sessions: the practical application of the course is demonstrated in the laboratory

Course content: The characteristics of soil environment; microbial flora and fauna of soil; microbial activities in soil; Nitrogen cycle, mineral transformation by micro-organisms. Ecological relationship among soil pathogens. Effects of pesticides on soil micro-organisms. Biodegradation and biofuels generation. Microbiology of the rhizosphere.