

SAMUEL ADEGBOYEGA UNIVERSITY, OGWA, EDO STATE
COLLEGE OF BASIC AND APPLIED SCIENCES
DEPARTMENT OF BIOLOGICAL SCIENCES



Course Code: MCB 421

Course Title: Petroleum Microbiology

No. of Units: 3

Course Duration: Three hours lecture for 14 weeks

Lecture Hours: Mondays 8:00am – 10:00am; Tuesdays 11:00am – 12:00noon

Status: Compulsory

Prerequisite: MCB 211

COURSE LECTURER

Enerijiofi, K. E., Ph. D (MNSM, MASM)

Room A106,

College of Basic and Applied Sciences Building,

Samuel Adegboyega University, Ogwa, Edo State, Nigeria.

Office Hours: Mondays: 12:00 – 2: 00pm; Wednesdays: 10:00am – 12:00noon

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COURSE DESCRIPTION

This course will see students through the Biogenesis of fossil fuels with emphasis on microbes as well the role of microbes in petroleum prospecting and recovery. Microbial corrosion of pipes and equipment will also be looked into as well as the concepts of Methanogenesis and methanotrophy. Also, the effect of crude oil spills on microbial activities in aquatic and terrestrial ecosystems will be studied and finally Biodeterioration and biotransformation of hydrocarbons (aliphatic and aromatic) into less toxic products will be critically examined.

COURSE OBJECTIVES

The objectives of this course are to:

- introduce students to the organic and inorganic origin as well as the stages involve in crude oil formation;
- explain the role of microorganisms in prospecting and recovery of crude oil from their oil bearing formation;
- explain the role played by microorganisms in corrosion of oil field equipment and possible ways to reduce / prevent microbial corrosion of pipes and equipment.
- explain the meaning of the concept methanogenesis and methanotrophy as well as their differences.
- inform the students of the effects on crude oil spills on the environment;

- introduce students to role of microorganisms in biodegradation and bioremediation of oil polluted environment

COURSE LEARNING OUTCOMES

At the end of the course, students will be able to:

- explain the organic and inorganic origin of crude oil as well as the stages involve in it's formation;
- provide information on the roles of microorganisms in the prospecting and recovery of crude oil;
- explain the role of microorganisms in biodegradation and bioremediation of oil polluted environment such as soil and water
- explain the roles played by microorganisms in corrosion of oil field equipment and possible ways to reduce / prevent microbial corrosion of pipes and equipment.
- differentiate the concept methanogenesis from methanotrophy;
- explain the effect on crude oil spills on the environment and
- know the role of microorganisms in biodegradation and bioremediation of oil polluted environment

GENERAL INSTRUCTIONS

The instructions below are well spelt out on the first day of the course lecture for the students understanding

- 1. Attendance:** It is expected that every student will be in class for lectures. In the case absence due to illness or unforeseen circumstances, the student must communicate as soon as possible to the course lecturer with a cogent reason, otherwise the student is assumed absent from lectures.
- 2. Code of Conduct in Lecture Rooms:** Students are expected to put off their cell phones during lectures. Food and drinks are not allowed.
- 3. Academic Integrity:** No violations of any kind is allowed. These include but not limited to dishonesty in assignments, examinations and or plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines as detailed in the Students' Handbook.
- 4. Assignments and Group Work:** Students do assignments and submit as agreed with the course Lecturer. However, failure to submit assignment as at when due will be recorded as zero, but in cases of earlier information for late submission, such assignments will be accepted and graded. The group work takes the form of seminar presentations by students with power points on chosen topics and thereafter submit report for grading and recording.

COURSE ASSESSMENT:

Attendance.....	5%
Mid-Semester Test	15%
Assignment / Group Work	10%
Examination	70%
Total.....	100%

COURSE OUTLINES

WEEK	TOPIC
1 &2	Biogenesis of fossil fuels with emphasis on microbes.
3 & 4	The role of microbes in petroleum prospecting and recovery.
5 & 6	Microbial corrosion of pipes and equipment
7	Mid semester Test
8 & 9	Methanogenesis and Methanotrophy
10 & 11	Effect of crude oil spills on microbial activities in aquatic and terrestrial ecosystems
12 &13	Biodeterioration and Biotransformation of hydrocarbons.
14	REVISION

READING LISTS

1. Wiley, J. M., Sherwood, L. M. and Woolverton, C. J. (2008). Prescott, Harley and Klein's Microbiology 8th Edition. McGraw-Hill International USA
2. Atlas, R. M. and Bartha, R. (1997). Microbial Ecology: Fundamentals and Applications. Addison Wesley Longman Inc.