MCB 303 – MICROBIAL GENETICS

COURSE PARTICULARS

Course Code: MCB 303
Course Title: Microbial Genetics
No. of Units: 3
Course Duration: Two hours of theory and three hours of practical per week for 15 weeks.
Status: Compulsory
Course Email Address: boboye@futa.edu.ng
Course Webpage:
Prerequisite: MCB 201, MCB 202

COURSE INSTRUCTORS

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COURSE DESCRIPTION

Survey of current status of microbial genetics (bacteria, fungi, viruses, protozoa and other microorganisms). Mutagenesis, isolation and characterization of mutants. Adaptation and genetics. Gene transfer and its mechanism: cloning vectors, transformation, transduction and lysogeny and, conjugation and conversion. Expression and regulation of genes. General and specialized methods and techniques in microbial genetics. Experiments with virulent phages, temperate phages and lysogenic bacteria, fungi and other lower eukaryotic organisms. Application of microbial genetics to various sectors: agriculture, medicine, food, environment, etc.
COURSE OBJECTIVES

The objectives of this course are to:

- introduce students to the status (past, current and future) of microbial genetics;
- teach students various techniques used in microbial genetics; and
- enable students to understand the relevance of microbial genetics in biotechnology.

COURSE LEARNING OUTCOMES / COMPETENCIES

Upon successful completion of this course, the student will be able to:

(Knowledge based)

- understand the importance of microbial genetics;
- explain how microorganisms are used to understudy the genetic mechanisms of other organisms (plants and animals); and
- relate microbial genetics to biotechnology.

(Skills)

- carry out basic experiments to:
  - manipulate gene/s to modify or produce trait;
  - isolate DNA and gene products; and
  - demonstrate genetic engineering.
- conduct literature search on the internet and libraries.

GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

Class Attendance: This is a requirement for any student to sit for test or examination. Each student must attend the course lectures and practical for a minimum of 60% of the class periods that this course will have been taught in the semester, before a test or examination is written. Below this minimum attendance, student will be disallowed to sit for test or examination.

Assignments 10%
Test(s) 20%
Practical 30% (Practical classes will be on the topics that will be discussed in the lectures).
Final Examination 40%
TOTAL 100%
GENERAL INSTRUCTIONS

Attendance: It is expected that every student will be in class for lectures and also participate in all practical exercises. Attendance records will be kept and used to determine each person’s qualification to sit for the tests and final examination. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with the course lecturer/s indicating the reason for the absence.

Academic Integrity: Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited. You are not allowed to make copies of another person’s work and submit it as your own; that is plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines for handling students’ misconduct as spelt out in the Students’ Handbook. Lateness to any lecture or practical is not allowed.

Assignments: Students should submit assignments as scheduled. Failure to submit an assignment as at stated deadline will earn you zero for that assignment. Only under extenuating circumstances, for which a student has notified any of the instructors in advance, will late submission of assignments be permitted.

Code of Conduct in Lecture Rooms and Laboratories: Students must wear laboratory coats when they are in the laboratory. Students should turn off their cell phones during lectures and any practical. Students are prohibited from engaging in other activities (such as texting, watching videos, etc.) during lectures and practical classes. Food and drinks are not permitted in the laboratories particularly during the practical. Other laboratory rules and regulations must be adhered to as stated in the laboratory.

READING LIST


Legend:

1 - Available in University and Departmental Libraries.
## COURSE OUTLINE

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<tr>
<th>Week</th>
<th>Topic</th>
<th>Remarks</th>
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| 1    | ● General introduction and overview of the course synopsis.  
       ● The importance of microbial genetics. Survey of past and current status of microbial genetics: Bacteria. | ● The objectives and goals of the course will be explained to students.  
● Each topic in the course description will be briefly discussed. |
| 2 & 3| ● Survey of past and current status of microbial genetics: fungi, viruses, protoza and other microorganisms.  
● ASSIGNMENT 1. | ● Students are expected to learn and understand the current status and importance of microbial genetics. |
| 4, 5 & 6| ● Mutagenesis, induction, isolation and characterization of microbial mutants. | ● Students will be made to understand mutagenesis as a tool for genetic manipulation. |
| 7, 8 & 9| ● Adaptation, Transformation, Transduction and Conjugation.  
TEST 1 will be conducted in the 8th week. | ● Students will be taught various mechanisms of gene transfer between microorganisms, microbes and higher organisms. |
| 10 & 11| ● General and specialized methods in microbial genetics. | ● Students will be requested to know some techniques including DNA isolation, nucleic acid hybridization and blottings. |
| 12 & 13| ● Genetic experiments with phages, bacteria and lower eukaryotic organisms.  
 ASSIGNMENT 2. | ● Students will be taught on efficient methods in microbial genetics. |
| 14 | ● Application of microbial genetics to various sectors of the medicine, agriculture, food, environment and industry. | ● The relevance of microbial genetics to medicine, agriculture, food, environment and industry will be discussed. |
| 15 | ● TEST 2 and Revision. | ● Students will be tested and difficult areas as required by the students will be re-taught. |