THOMAS ADEWUMI UNIVERSITY OKO COURSE OUTLINE		
Faculty	COMPUTING AND APPLIED SCIENCES	
Department	BIOLOGICAL SCIENCES	
Course title	**MICROBIAL GENETICS AND MOLECULAR BIOLOGY**	
Year of study	3	
Course code	MCB 302	
Credit hours	3	
Contact hours	45	
Mode of delivery	CLASSROOM LECTURES LABORATORY PRACTICAL SESSIONS	
Mode of assessment		WEIGHT%
Continuous assessment		30%
Final examination		70%
Total		100%
Course lecturers and Instructors	Dr. Adekemi T. Dahunsi-LECTURER	
Course description	Microbial Genetics and Molecular Biology is a course that provide students with an understanding of the principles and mechanisms underlying the genetics and molecular biology of microorganisms. This course delves into the intricate world of microorganisms, exploring how their genetic material influences their behavior, adaptation, and evolution, while also emphasizing the essential role they play in various biotechnological and medical applications.	
Course objectives	This course will make it possible to understand 1. Structure and properties of DNA and RNA 2. Principles of genetic analysis 3. Plasmids and transposable genetic elements. 4. Mutagenesis and DNA repairs. Mechanism and nature of mutation, induction, isolation and characterization of mutants. 5. Genetic exchanges in prokaryotes including transformation, transduction, phage conversion and conjugation.	

	6. Genetic coding and expression of genetic information. 7. Recombinant DNA technology and methods in gene cloning. Recent techniques in microbial genetics: Polymerase chain reaction (PCR) 8. Bioinformatics i.e., the organization, storage, retrieval and analysis of biological data. 9. Applications of genetic engineering
Learning outcomes	By the end of the course, students will be able to: 1. Describe the basic principles of microbial genetics encompassing DNA replication, gene expression, and mutation. 2. Explain the mechanisms of gene regulation in microorganism. 3. Describe horizontal gene transfer mechanisms, 4. Understand the roles of plasmids and other mobile genetic elements. 5. Explain genetic coding and expression of genetic expression 6. Understand recombinant DNA technology and gene cloning. 7. Describe techniques used in microbial genetics 8. Understand bioinformatics as an important tool in molecular biology 9. Appreciate the use of microorganisms in biotechnology, spanning medical and industrial use.
Teaching and learning	The class will meet for three hours a week. It will be a combination of teachings and practical sessions.
Detailed course content	Structure and properties of DNA and RNA. Principles of genetic analysis. Plasmids and transposable genetic elements. Mutagenesis and DNA repairs. Mechanism and nature of mutation, induction, isolation and characterization of mutants. Genetic exchanges in prokaryotes including transformation, transduction, phage conversion and conjugation. Genetic coding and expression of genetic information. Recombinant DNA technology and methods in gene cloning.

	Recent techniques in microbial genetics: Polymerase chain reaction (PCR). Bioinformatics i.e., the organization, storage, retrieval and analysis of biological data. Applications of genetic engineering
Course content sequencing	
Weeks	
Week 1	Structure and properties of DNA and RNA. Principles of genetic analysis.
Week 2	Plasmids and transposable genetic elements. Mutagenesis and DNA repairs.
Week 3	Mechanism and nature of mutation, induction, isolation and characterization of mutants. Continuous Assessment 1
Week 4	Genetic exchanges in prokaryotes including transformation, transduction, phage conversion and conjugation
Week 5	Genetic coding and expression of genetic information.
Week 6	Recent techniques in microbial genetics: Polymerase chain reaction (PCR).
Week 7 - 8	Bioinformatics i.e., the organization, storage, retrieval and analysis of biological data.
Week 9	Continuous Assessment 2
Week 10 – 11	Applications of genetic engineering
Week 12	Revision
Recommended reading material	
1. Larry Snyder, Joseph E. Peters, Tina M. Henkin, and Wendy Champness (2013). Molecular Genetics of Bacteria. ASM Press. 2. Joanne Willey and Kathleen Sandman and Dorothy Wood (2020). Prescott's Microbiology. McGraw-Hill Higher Education 3. Michael T. Madigan, Kelly S. Bender, Daniel H. Buckley W. Matthew Sattley and David A. Stahl (2019). Brock Biology of Microorganisms. Pearson Educational Limited	

Course code: MCB 302

Course title: MICROBIAL GENETICS AND MOLECULAR BIOLOGY

Preamble: This course is going to teach the genetic intricacies of microorganisms, understanding how their DNA shapes behavior, adaptation, and evolution. Explore techniques used in this field, their biotechnological and medical applications. Uncover the mysteries of microbial genetics and molecular biology in the journey through the course.

Specific course objectives/learning outcomes.

The course will enable the understanding of the following:

This course will make it possible to understand

1. Structure and properties of DNA and RNA
2. Principles of genetic analysis
3. Plasmids and transposable genetic elements.
4. Mutagenesis and DNA repairs. Mechanism and nature of mutation, induction, isolation and characterization of mutants.
5. Genetic exchanges in prokaryotes including transformation, transduction, phage conversion and conjugation.
6. Genetic coding and expression of genetic information.
7. Recombinant DNA technology and methods in gene cloning. Recent techniques in microbial genetics: Polymerase chain reaction (PCR)
8. Bioinformatics i.e., the organization, storage, retrieval and analysis of biological data.
9. Applications of genetic engineering

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

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