COURSE CODE: MCB 203
COURSE TITLE: INTRODUCTION TO BIOTECHNOLOGY
NUMBER OF UNITS: 3UNITS
COURSE DURATION: THREE HOURS PER WEEK

COURSE DETAILS:

Course Coordinator: Prof. I.Akpan Bsc., Msc., PhD
Email: iyakpan@yahoo.com
Office Location: Room A212, COLNAS
Other Lecturers: Dr.Oluwafemi, Flora, Dr. Odedara, O.O

COURSE CONTENT:

- Definitions of biotechnology
- Historical development of biotechnolog
- Interdiscipinary nature of biotechnology
- Benefits of biotechnology to man
- Importance of microbiology in biotechnology
- Applications of biotechnology
- Techniques in biotechnology

COURSE REQUIREMENTS:

This is a compulsory course for all microbiology students and an elective course for Biology students of Botany option. 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.

LECTURE NOTES

HISTORICAL DEVELOPMENT OF BIOTECHNOLOGY

- Biotechnological production of foods and beverages
- Biotechnological processes initially developed under non sterile conditions
- Introduction of sterility to biotechnological processes
- Applied genetics and recombinant DNA technology

DEFINITIONS OF BIOTECHNOLOGY

- Application of biological organisms, systems or processes to manufacturing and service industries
- Application of scientific and engineering principles to the processing of materials by biological agents to provide goods and services
- The use of living organisms and their components in agriculture, food and other industrial processes etc.

INTERDISCIPINARY NATURE OF BIOTECHNOLOGY

- Biotechnology can be applied in the following fields:

Microbiology, Biochemistry, Food technology engineering, Biochemical engineering, Genetics, Food science, Chemical engineering and Mechanical engineering.

BENEFITS OF BIOTECHNOLOGY TO MAN

- Agriculture, forest and horticulture – Novel crops or animal varieties, pesticides
- Diagnostics – Clinical testing and diagnosis, food, environment, agriculture
- Food – wide range of food products, fertilisers, beverages, ingredients
- Environment – waste treatment, bioremediation, energy production
- Therapeutics – Pharmaceutical products for the cure or control of human and animal diseases eg antibiotics, vaccines gene therapy
- Chemical intermediates – Reagents including enzymes, DNA/RNA, speciality chemicals
- Equipment – Hardware, bioreactors, software and consumables supporting biotechnology

Application of biotechnology

- Plant and animal agriculture
- Healthcare
- Environmental technology
- Waste technology
- Enzyme technology
- Bioprocess technology
- Renewable resource technology

Techniques in biotechnology

- Genetic engineering
- Tissue culture
- Protoplast fusion
- Gene synthesis
- Development of monoclonal antibodies and Hybridomas
- Development of DNA probes
- Gene isolation, mordification and insertion in existing genomes and ectors
- Reverse transcriptase
- Synthesis of peptides and vaccines
- Uptake of free DNA and DNA injection in eukaryotes