

University Of Agriculture, Abeokuta

College Of Natural Sciences

Department Of Microbiology

Course Title: Biotechnology

Course Code BIO 404

Course Lecturers: Prof. I. Akpan , Dr. F. Oluwafemi

Course Objectives:

- i) Enable students to understand that Biotechnology is multi-disciplinary
- ii) Enable students understand that microorganisms can be put into practical application to manufacture products that are needed by the society
- iii) Enable students to understand that Biotechnology is multifaceted

What is Biotechnology?

- Interdisciplinary pursuit
- Quantitative extension of approaches to problems
- Integration & marshalling of concepts & methodologies from separate disciplines

Interdisciplinary Nature of Biotechnology

- Genetics
- Biochemistry/Chemistry
- Food Science
- Food Technology
- Mechanical Engineering
- Chemical Engineering
- Biochemical Engineering
- Electronics
- Microbiology

Main objectives of Biotechnology

- Innovation
- Development
- Optimal operation of processes

Requirement of Biotechnology

- Skilled workforce
- Supportive public

Seven Companies involved in Biotechnology

- Therapeutics
- Diagnostics
- Agriculture/forestry/horticulture
- Food
- Environment
- Chemical intermediates
- Equipment

Difference between Biotechnology and Biology:

- Scale of operation, scaling up biological processes

Products of fermentation

- Organic acids
- Polysaccharides
- Enzymes
- Vaccines
- Hormones

Three –component central core of Biotechnology

- Obtaining the best biological catalyst
- Best environment for the catalyst
- Separation and purification of products

Safety, social & ethical considerations in Biotechnology

Advantages of genetic modification:

- Greater precision of gene introduction
- Introduction of genes into un-related species

Safety of genetically-modified foods

Genetically-modified foods are safe because of the following:

- Organisms with unusual pathogenicity will not be released
- All releases into the environment are monitored and recorded
- Up to date no adverse effects recorded
- Transgenic crops are conducted under strict conditions

Main ethical considerations relating food use of transgenic organisms

- Transfer of human genes to food animals
- Transfer of genes from forbidden animals

- Transfer of animal genes into food plants
- Use of organisms containing human genes