COURSE CODE: *PBS 507*

COURSE CODE: *Introduction to Crop Biotechnology*

NUMBER OF UNITS: *3 Units*

COURSE DURATION: *Three hours per week*

COURSE DETAILS:

Course Coordinator: Dr. I. O. Daniel
E-mail: daniel@unaab.edu.ng
Office Location: Room 245, COLPLANT
Other Lecturers: Mr. O. A. Oduwaye and Mr. E. O. Idehen

COURSE CONTENT:

Definition of biotechnology, its branches and its relationship to basic sciences. Importance of biotechnology in crop improvement and production. Nucleic acid hybridization, function of endonuclease, polymerase and other enzymes. Role of southern blot, restriction fragment length polymorphism and other techniques in gene mapping. Transformation and production of transgenic crops. Protoplast, cell, tissue and organ culture, *in-vitro* pollen germination and fertilization, protoplasm and cell fusion, crop micro-propagation and somatic embryogenesis in rapid multiplication.

Practical: Preparation of plant growth media, aseptic transfer of explants, micro-propagation of plants.

COURSE REQUIREMENTS:

This is an elective course, thus 500 level students registering for more than 36 units in the first semester cannot be registered for this course. All students that register for the course are expected to participate fully in all course activities and have minimum of 70% attendance to be able to write the final examination.

READING LIST:

1. Thottappilly, G., Monti, L. M., Mohan-Raj, D. R. and Moore, A. W. (1992). Biotechnology: Enhancing research on tropical crops in Africa. CTA/IITA co-publication. IITA, Ibadan, Nigeria. 376pp.

2. Brown, J. and Caligari, D. S. (2008). An introduction to plant breeding. Blackwell Publishing Ltd. 9600 Garsinton Road, Oxford OX4 2DQ, UK.

LECTURE NOTES

The course

LECTURE 1

- Definition of biotechnology
  - Biotechnology is the use of biological processes, organisms, or systems to manufacture products intended to improve the quality of human.
- Branches and its relationship to basic sciences.

- Agriculture.
- Animal Husbandry.
- Health care (also termed as Medical Biotechnology).
- Industry.
- Aquaculture and Marine biotechnology.
- Environmental Biotechnology.
- Aquaculture and Marine biotechnology.
- Environmental Biotechnology.
- Bioinformatics.

- Importance of biotechnology in crop improvement and production.

- Plant breeding by utilization of molecular biotechnological tools,
- Genetic improvements of foods
- Tolerance of stress in plants.
- Molecular farming.
- Growth/development of plants through generation.

LECTURE 2

- Nucleic acid hybridization
- Function of endonuclease
- Polymerase and other enzymes

LECTURE 3

- ❖ Role of southern blot
- ❖ Restriction fragment length
- ❖ Polymorphism and other techniques in gene mapping.

LECTURE 4

- ➢ Transformation and production of transgenic crops.

- Transformation is the heritable change in a cell or organism brought about by the uptake and establishment of introduced DNA. There are two main methods of transforming plant cells and tissues:
- ❖ The "Gene Gun" method (also known as microprojectile bombardment or biolistics).
- ❖ The Agrobacterium method

LECTURE 5

- ➢ Protoplast, cell, tissue and organ culture.
- ❖ *In-vitro* pollen germination and fertilization
- ❖ protoplasm and cell fusion
- ❖ Crop propagation and somatic embryogenesis in rapid multiplication of agriculture and rural development in the developing countries.

PRACTICALS:

- ➢ Preparation of media
- ➢ Aseptic transfer of explants
- ➢ Micro-propagation of plants