**DEPARTMENT OF BOTANY**

**SYLLABUS DISTRIBUTION**

**AS PER FYUGP, NEP -2022**

**SEMESTER - VII**

**Paper Title – Major Paper 17 (MJ-17)**

**CREDIT-04 [THEORY- 03 + PRACTICAL- 01]**

**Plant Biotechnology**

**DR.AFTAB ALAM KHAN:**

**Course Outcomes**:

On the completion of the course the students will be able to

1. Understand the core concepts and fundamentals of plant biotechnology and

2. genetic engineering 2. Develop their competency on different types of plant tissue culture

3. Analyze the enzymes and vectors for genetic manipulations

4. Examine gene cloning and evaluate different methods of gene transfer

5. Critically analyze the major concerns and applications of transgenic technology.

**Full Mark - 60 Time: - 3 Hrs.**

**Unit I: 11 lectures**

Plant Tissue Culture Historical perspective; Composition of media; Nutrient and

Hormone requirements (role of vitamins and hormones) Totipotency;

Organogenesis; Embryogenesis (somatic and zygotic); Protoplast isolation, culture

and fusion, Tissue Culture Applications.

**Unit II: 11 lectures**

Recombinant DNA technology Restriction Endonucleases (History, Types I-IV ,

biological role and application); Restriction Mapping (Linear and Circular); Cloning

Vectors: Prokaryotic (pUC18 and pUJC19, pBR322, Ti plasmid, BAC); , Lambda phage,

M13 phagemid, Cosmid, Shuttle vector; Eukaryotic Vectors (YAC).

**DR. SHARMILA CHAKRABORTY:**

**Unit III: 11 lectures**

Gene Cloning and Methods of Gene Transfer Basic concept of Gene cloning,

advantages of gene cloning, Bacterial Transformation and selection of recombinant

clones using various strategies, PCR- mediated gene cloning; Gene Construct; Plant

transformation vector, T-DNA and viral vector, Agrobacterium-mediated

Transformation protocols, molecular mechanism of T-DNA transfer, direct gene

transfer method by Electroporation

**Unit IV: 12 lectures**

Applications of Biotechnology Engineering plants to overcome abiotic ( drought and

salt stress ) and biotic stress pest Resistant ( Bt- cotton ) and herbicide resistant

plants ( Roundup Ready soyabean ) ; Transgenic crops with improved quality traits

( FlavrSavr tomato, Golden rice ) ; improved horticultural varieties ( Moon dust

carnations ) ; Role of Transgenic in bioremediation (Superbug).