

OBJECTIVES: To enable the students to –

- learn recombinant DNA technology , and
- acquire techniques involved in gene transfer and r-DNA technology blotting techniques, DNA fingerprinting, sequencing , etc.,

COURSE:

UNIT – I: RECOMBINANT DNA TECHNOLOGY – 1

1. r-DNA technology – Isolation and cutting of DNA molecule
2. Steps in r-DNA technology.
3. Classification of Restriction endonucleases. Enzymes used in molecular cloning: Polymerases, ligases, phosphatases, methylases, Kinases and nucleases.

UNIT – II: RECOMBINANT DNA TECHNOLOGY – 2

1. Cloning vehicles – plasmids, PBR-322, phages, cosmids, shuttle vectors
2. Genomic libraries – Genomic and c-DNA libraries
3. Expression of cloned genes
4. Factors influencing the expression of foreign genes.

UNIT – III: GENE TRANSFER TECHNIQUES

1. Cutting and joining DNA - Methods of blunt end ligation and Cohesive end ligation (Linkers, adaptors and homo polymer tailing)
2. Transfection and transformation. Selection of transformed cells. Screening methods (genetic markers and blue white screening).
3. Transformation selection of transformed cells and screening methods (genetic markers and blue white screening)

UNIT – IV: TECHNIQUES IN GENETIC ENGINEERING

1. Blotting techniques – Southern, Northern & Western blotting
2. Polymerase chain Reaction (PCR)
3. Restriction fragment length polymorphisms (RFLP's)
4. Random amplification polymorphic DNA's (RAPD's)
5. DNA sequencing
6. DNA fingerprinting

UNIT-V: BIOINFORMATICS

1. Introduction of Bioinformatics.
2. Sequence information sources- EMBL, GENBANK, Entrez, Unigene.
3. Protein information sources – PDB, SWISSPROT, TREMBL.
4. Sequence similarity searches – BLAST, FASTA.

REFERENCES :

1. Principles of gene manipulations-by R.W.Old and S.B.Primrose, Blackwell publications
2. Genetic Engineering by Boylan, Pearson education
3. Genetic Engineering and Biotechnology by V.Kumar Gera
4. Genetic Engineering by R.Williamson, publ:Academic press.

OBJECTIVES: To enable the students to –

- Acquire knowledge about Plant tissue culture its uses and techniques involved in tissue culture
- Study Animal biotechnology which include Artificial insemination, invitro fertilization and embryo transfer.

COURSE:

PLANT BIOTECHNOLOGY

UNIT – I: PLANT TISSUE CULTURE

- a. Composition of media (MS and Gamborg's only). Preparation of media and methods of sterilization.
- b. Role of plant growth regulators in differentiation.
- c. Initiation & maintenance of Callus and suspension cultures; Single cell clones.

UNIT – II: APPLICATIONS OF TISSUE CULTURE

- a. Meristem culture and production of virus free plants. Somatic embryogenesis and organogenesis.
- b. Micro-propagation, regeneration, production of haploids, protoplast culture and somatic hybridization.
- c. Mass cultivation of cell cultures and process engineering –batch and continuous culture Bioreactor
- d. Production of commercially useful compounds by plant cell culture

UNIT – III: GENE TRANSFER IN PLANTS

- a. Gene transfer through Agrobacterium, Ti plasmid.
- b. Applications of r-DNA technology in agriculture (Bt-cotton, Golden Rice)
- c. Production of therapeutic proteins from transgenic plants

ANIMAL BIOTECHNOLOGY

UNIT – IV: ANIMAL CELL CULTURE

- a. Introduction to Animal Biotechnology
- b. Principles of animal cell culture – culture vessel
- c. Cell culture media preparation, sterilization, types of cultures
- d. Characteristics of cells in culture: Contact inhibition, anchorage dependence, cell-cell communication etc., Cell senescence; cell and tissue response to trophic factors. Immortal cells, cell lines
- e. Maintenance & Preservation of cell lines.

UNIT – V: APPLICATIONS OF ANIMAL BIOTECHNOLOGY

- a. Invitro fertilization and embryo transfer technology.
- b. Production of transgenic animals and molecular pharming (mice, sheep).

REFERENCES:

1. Plant tissue culture-Basic and Applied-by Timir Baran Jhan and B.Ghosh
2. Essential of biotechnology for students by Satya N.Das
3. Plant tissue culture by Kalyan Kumar De -
4. Animal cell as bioreactor – by Terence Gartwright, Cambridge university press
5. Introduction to verterinary genetics by F.W.Nicholas, Oxford university press.

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM
V SEMESTER **BIOTECHNOLOGY** TIME: 3 Hrs/Week
BTH 5751 (2) **GENETIC ENGINEERING** Max. Marks: 50
w.e.f 2015-2018(AC) **PRACTICAL SYLLABUS – III A**

OBJECTIVES : To enable the students learn the techniques of genetic engineering.

COURSE : Experiments on

- a. Basic transformation
- b. Isolation of plasmid DNA
- c. Restriction digestion of DNA
- d. Ligation of DNA
- e. PCR
- f. DNA Fingerprinting

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM
V SEMESTER **BIOTECHNOLOGY** TIME: 2 Hrs/Week
BTH 5751 (2) **GENETIC ENGINEERING** Max. Marks: 50
w.e.f 2015-2018(AC) **PRACTICAL SYLLABUS – III B**

OBJECTIVES: To enable the students to acquire the techniques and inoculation methods in plant tissue culture.

COURSE: Experiments on

- a. Preparation of MS media & it's chemical composition
2. Preservation of tissue culture plants under cold conditions
3. Pollen culture
4. Seed culture
5. Anther culture

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