

Course Code	Course Name	Credits
26BT010	PLANT BIOTECHNOLOGY	04

Course Objectives

- Recall the history and the techniques in plant tissue culture
- Gain knowledge on Crop development and plant tissue culture
- Biotechnological applications of plants tissue culture, production & improvement of them.
- Understand the fundamental principles of plant tissue culture and plant regeneration mechanisms.
- Apply molecular tools and techniques for plant genetic transformation.

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Understand the history and fundamentals of plant tissue culture.
- Acquire knowledge on limitations and challenges in plant tissue culture.
- Illustrate the role of transgenic plants and its advantages
- Design strategies for introducing specific traits into plants.
- Acquire Hands-on proficiency in plant tissue culture and genetic modification..

Unit 1 - Introduction of PTC (10 Hrs.)

History of PTC, Concept of Cellular Totipotency. Laboratory Organization, Sterilization Techniques, Media Preparation. Types of media – MS, Nitsh, Gamborgs. Plant growth regulators.

Unit 2 – Plant tissue culture (12 Hrs.)

Cell culture, suspension culture, organ culture, callus culture, meristem culture, anther, pollen, embryo culture, Shoot tip Culture (Virus Free Plants) and their applications. Organogenesis, Somatic hybridization, Somatic embryogenesis..

Unit 3 - Genetic manipulation of plants (13 Hrs.)

Introduction, protoplast isolation, culture and regeneration, methods of fusing protoplasts, somatic hybridization. Protoplast and tissue culture manipulation for genetic manipulation of plants. Cryopreservation

Unit 4 - Plant Genetic Engineering (15 Hrs.)

Genetic engineering of herbicide resistance, insect resistance, virus resistance, Delay of fruit ripening, Seed storage proteins, Edible Vaccines & Plantibodies

Unit 5 - Transgenic plants (10 Hrs.)

Transgenic plants, genetically modified food, application, future perspectives & ecological impact of transgenic plants. Synthetic seed..

Reference Books:

1. Grierson,D., and S.N. Covey. Plant Molecular Biology. Blackie& Sons. Ltd. Glasgow. 1988.
2. Lycett, G.W. and D. Grierson (Eds).Genetic Engineering of Crop Plants. Heinemann, London.1990.
3. Chrispeeds,M.J. and D.F. Sadava. Plants, Genes and Agriculture.. Jones and Bartlett, Boston. 1994.
4. Mantel, S. H, Mathews. J. A, Mickee. R.A. An Introduction to Genetic Engineering in Plants. Blackwell Scientific Publishers, London. 1985.
5. Dodds J.H. Plant Genetic Engineering. Cambridge Univ.Press, Cambridge. 1985.
6. Bernard R Glick. and J.J. Pasternak. Molecular biotechnology, Principle and Applications of Recombinant DNA. ASM Press, Washington, D.C.2002.
7. Monica A. Hughes. Plant Molecular Genetics. Addison Wesley Longman, Harlow, England.1996.
8. Satyanarayana . U. Biotechnology, Books and Allied (p) Ltd. 2008.