Course Code	Course Title	C	H	I	E	T
17U6ZME3	Biotechnology	7	6	25	75	100

Objectives

- To study the scope and applications of biotechnology
- To provide a deep and thorough knowledge in the rapidly expanding field of biotechnology.
- To motivate the students to learn the basic concepts and applications of bioinformatics.

Learning Outcome

1. Expected to have strong appreciation for scientific research in theoretical and experimental areas
2. Motivation for taking up biotechnological entrepreneurship.

Unit – I

History, scope and importance of biotechnology, Biotechnology in India, Enzymes (restriction endonucleases, ligases, linkers and adapters), Vectors (Plasmids, Phage vectors, Cosmids and artificial chromosomes) Basic steps and techniques in rDNA technology.

Unit - II

Gene libraries, construction of genomic library and cDNA library. PCR technique and DNA amplification. Methods of transfer of desired gene with target cell. Blotting techniques – southern, northern and western blotting.

Unit - III

DNA finger printing (DNA Profiling), and its application. Molecular markers – RFLP. Stem cells – types and potential use, gene therapy, organismal cloning.

Unit – IV

Applications of Plant Biotechnology - Single Cell Proteins (SCP) Biofertilizers – Biopesticides – Bt cotton - Applications of Animal Biotechnology in Medicine, Animal Breeding and Environmental Management - Transgenic animals (Cow & Mice) – Hybridoma technique and production of monoclonal antibodies - Gene therapy.

Unit – V

Principle, techniques and applications of animal cell culture -Environmental Biotechnology - Biofuels – Bioremediation - Genetically Modified Microorganisms (definition); Biosafety, Intellectual Property Rights (IPR) and protection (IPP) – Human Genome project.

Text Books

1. Dubey, R.C. 2004, A text book of Biotechnology, S. Chand and Co., New Delhi.
2. Purohit, S.S. and S.K. Mathur, 1999, Biotechnology – Fundamentals and applications, Agro - Botanica, New Delhi.

References Books

1. Brown, T.A. 1995, Gene Cloning, Stanley Thomas Publishers.
2. Masters, J.R.W. 2000, Animal Cell Culture - A Practical Approach, Oxford University Press.
3. Trevan, M.D., S. Boffey, K.H. Goulding and P. Stanbury. 1990, Gene Biotechnology , Himalaya Publishing House, New Delhi.
4. Glick, B.R. and J .J. Pasternak (1994). Molecular Biotechnology, ASM Press.
5. Mitra, S. 1996, Genetic Engineering Principles and Practice, Macmillan India Ltd.
6. Trehen, K. 2002, Biotechnology, New Age International (P) Ltd, New Delhi.