

IDCBT-426	BIOTECHNOLOGY AND ITS APPLICATIONS	2 CH	50 marks
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- CO-1: Remember and understand the basic concepts/Principles of **Biotechnology and Its Applications**
 CO-2: Analyse the Various Concepts to understand them through case studies
 CO-3: Apply the knowledge in understanding practical problems
 CO-4: Execute/Create the Project or field assignment as per the knowledge gained in the course

Unit-I

Fundamentals of Biotechnology: Structure of DNA and RNA; DNA as the genetic material (experimental evidences); Central dogma of molecular biology. Genome organization of prokaryotes and eukaryotes; Nucleosome concept.

Unit-II

Concept of gene cloning; DNA isolation techniques; Restriction endonucleases, DNA polymerase, Ligase; Cloning vectors- plasmid, bacteriophage, cosmid, BAC, YAC; Expression vectors: bacteria and yeast based expression vector; Introduction of recombinant DNA into host cells, Screening of recombinants. C-DNA library and Genomic library

Unit-III

Biotechnological applications in agriculture: Pest resistant plants, Bt Cotton; Biotechnological applications in medicine; Gene Therapy; Molecular diagnosis: PCR and its variants (RT-PCR); DNA finger printing; Therapeutic proteins and peptides (Insulin, STH, Erythropoetin).

Unit-IV

Transgenic animals production: Induction of superovulation, Embryo collection and evaluation, Embryo splitting, Embryo sexing, Embryo transfer, Advantages of embryo transfer in farm animals, *In vitro* fertilization, Embryo cloning. Applications of transgenic animals. Ethical Issues: Public concerns on GMOs & LMOs, Roles of Institutional Biosafety Committee, RCGM, GEAC ethics in clinical trials, Genetic testing.

Suggested readings:

1. Elements of Biotechnology, P K Gupta, Rastogi Publication (2015). ISBN-13: 9788171339372.
2. Recombinant DNA: A Short Course, Amy A. Caudy, James D. Watson, Jan A. Witkowski, Richard M. Myers, WH Freeman (2006), ISBN-13: 9780716728665.

	PARTICIPATION IN NCC OR NSS OR OTHER (NON-CREDIT COURSE)	2 CH	50 marks
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*Interdisciplinary Value Aided Course with total intake of 60 students from other departments