

5th Semester	RBT5C001	Genetic Engineering	L-T-P 3-0-0	3 Credits
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Module I:**(8 hours)**

Scope of Genetic engineering, Basic principles of DNA isolation and purification, Enzymes used in genetic engineering, Cloning Vectors (Plasmid, Bacteriophage Cosmid, YAC and BAC), Expression vector, Gene library

Module II:**(8 hours)**

Selection and identification of recombinant bacterial cells, principle, methodology and applications of PCR, DNA fingerprinting- methodology and its application, site directed mutagenesis, antisense RNA, siRNA and miRNA, Ribozyme technology

Module III:**(8 hours)**

Principles, procedure and applications of RFLP, RAPD, AFLP, Gene targeting, Gene mapping, restriction mapping, Protein engineering concept with examples, Southern and Northern blotting, Molecular markers and its applications

Module IV:**(8 hours)**

DNA transfection-physical methods (microinjection, electroporation, biolistic), Chemical mediated DNA transfection, viral DNA transfection, Saccharomyces cerevisiae expression system, Baculovirus-insect cell expression system, Gene therapy and its application

Module V:**(8 hours)**

Genetic engineering in animal-production and application of transgenic mice, Manufacturing of therapeutic products (insulin and immune modulators by rDNA technology), Genetic engineering regulations and safety guidelines, DNA vaccine technology .

Books:

1. Molecular Cloning by Sambrook
2. Gene Cloning by T.A Brown
3. Principle of gene manipulation by Gold and Primrose
4. Plant Biotechnology by H S Chawla

Digital Learning Resources:

Course Name: Genetic Engineering: Theory and Applications

Course Link: <https://nptel.ac.in/courses/102/103/102103074/>

Course Instructor: Prof. Dr. Vishal Trivedi, IIT Guwahati