

B.Tech. Biotechnology: Semester-VII BBT 703: MEDICAL BIOTECHNOLOGY	
Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test -12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
Credits: 4	Attendance – 12 Marks
	End Semester Exam – 70 marks

Course Objective

The course aims to build on previous study and, through team-based research, student-led journal clubs and critical evaluation of scientific literature, challenge you to investigate new developments in selected, medical applications of biotechnology

Course Learning Outcomes

After completing the course, the student shall be able to:

- CO1: Research, evaluate and critically assess the theoretical basis and practical application of selected medical biotechnologies.
- CO2: Demonstrate knowledge and understanding of selected medical biotechnologies.
- CO3: Describe in detail essential facts and theory in molecular biology and biotechnology when applied to medicine.
- CO4: Describe and critically evaluate aspects of current research in the biosciences with reference to reviews and research articles
- CO5: With limited guidance, deploy established techniques of analysis and enquiry within the biosciences.

Unit 1: Classification of genetic diseases

Chromosomal disorders (Numerical disorders like trisomies & monosomies); Structural disorders (deletions, duplications, translocations & inversions); Chromosomal instability syndromes. Gene controlled diseases (Autosomal and Xlinked disorders)

Molecular basis of human diseases: Pathogenic mutations. Gain of function mutations: Oncogenes, Huntingtons Disease. Loss of function: Tumour Suppressor. Genomic. Dynamic Mutations: Fragile- X syndrome, Myotonic dystrophy. Mitochondrial diseases

Unit 2: Prenatal diagnosis

Invasive techniques (Amniocentesis, Fetoscopy, Chorionic Villi Sampling (CVS) and Non-invasive techniques (Ultrasonography, X-ray, TIFA, maternal serum and fetal cells in maternal blood). Diagnosis using protein and enzyme markers, monoclonal antibodies. DNA/RNA based diagnosis Hepatitis, CML- bcr/abl, HIV-CD4 receptor.

Clinical management and Metabolic manipulation – PKU, Familial Hypercholesterolemia, Rickets. Gene therapy - Ex-vivo, In-vivo, Insitu gene therapy.

Unit 3: Vectors used in gene therapy

Biological vectors (retrovirus, adenoviruses); Herpes Synthetic vectors (liposomes, receptor mediated gene transfer).

Head
Department of Biotechnology

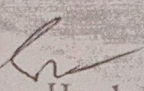
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
Gene therapy trials: Familial Hypercholesterolemia, Cystic Fibrosis, Solid tumors. Cell and tissue engineering: Stem cell Potential use of stem cells – Cell based therapies, Nanomedicine.

Suggested Readings

- Diagnostic and Therapeutic Antibodies (Methods in Molecular Medicine by Andrew J.T. George (Editor), Catherine E. Urch (Editor) Publisher: Humana Press; edition (2000)
- Molecular Diagnosis of Infectious Diseases (Methods in Molecular Medicine) by Jochen Decker, U. Reischl Amazon
- Human Molecular Genetics by T. Strachan, Andrew Read Amazon Sales Rank:
- Principles of Biostatistics by Marcello Pagano , Kimberlee Gauvreau
- Essentials of Epidemiology in Public Health, 2nd Edn by Ann Aschengrau , George R., III Seage


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