

## MEDICAL BIOTECHNOLOGY

Semester	Subject Code	Category	Lecture		Theory		P	C
VI	21CBT6D	Elective - III	4 hrs per week	60	4 hrs per week	60	0	3

### COURSE OBJECTIVE:

- To understand the concepts of medical biotechnology and its application in treatment of diseases.

### COURSE OUTCOMES:

- On the successful completion of the course, students will be able to

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL (K1-K4)
CO1	Understand human physiology and metabolic disorders	K1
CO2	Describe the various microbial diseases.	K2
CO3	Discuss the rights and licensing of copyright.	K2
CO4	Illustrate about Gene therapy and its application in treating various diseases.	K3
CO5	Analyze advanced techniques in treating diseases.	K4

**Knowledge Level:** K1- Remember, K2- Understand, K3- Apply, K4-analyze

### MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	M	M	S
CO2	S	S	S	S	S	S
CO3	M	M	S	M	S	M
CO4	S	S	S	S	S	M
CO5	M	S	S	S	S	S

S-strong; M- medium; L-low

## **UNIT I**

### **HUMAN PHYSIOLOGY AND METABOLIC DISORDERS**

**10 Hours**

Introduction to Human Physiology-Respiratory system, Circulatory system, Digestive system, Excretory system, Nervous system and Reproductive system. Metabolic Disorders: Phenylketonuria, Diabetes mellitus, Hypercholesteremia, Rickets, Hyperthyroidism and Hypothyroidism.

## **UNIT II**

### **PATHOGENESIS**

**10 Hours**

Mechanisms of infection and Epidemiology, prevention, diagnosis and treatment— Bacterial (Tuberculosis, Cholera), Viral (HIV, Rabies), Fungal (Athlete's foot) and Parasite (Malaria).

## **UNIT III**

### **DIAGNOSTIC PROCEDURES**

**15 Hours**

Prenatal diagnosis – Invasive techniques (Amniocentesis, fetoscopy, chorionic villi sampling) and Non-invasive techniques (Ultrasonography, X-ray, TIFA), maternal serum and fetal cells in maternal blood. Disease Diagnosis- Hepatitis, CML, AIDS using Protein and enzyme markers, DNA/RNA based diagnosis.

## **UNIT IV**

### **GENE THERAPY**

**15 Hours**

Gene therapy: Introduction, Basic process of gene therapy, Types of Gene therapy ex-vivo Gene therapy, in vivo Gene therapy, strategies of gene therapy. Gene therapy trials –Cystic fibrosis, Alzheimer's disease, Severe combined immune deficiencies, AIDS, Parkinson's disease.

## **UNIT V**

### **ADVANCED TECHNIQUES**

**10 Hours**

Nanomedicine: Introduction to nanomedicine, Applications of nanomedicine. Stem Cells and its clinical implications, History of stem cell research, Types of stem cells based on potential Po (Totipotent, Pluripotent and multipotent) Cell based therapies,. Microarray technology- genomic array, cDNA array and their application to diseases. Face transplants, human genome projects, 3 dimensional printed organs.

**Distribution of Marks:** Theory 80% and Problems 20%

### **TEACHING METHODOLOGY:**

- Class room teaching
- Assignments
- Discussions
- Homework
- PPT presentations

- Seminars
- Models and charts

#### **TEXTBOOKS:**

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	J Brostoff, D Male, D B Roth, I M Roitt	Immunology.	Elsevier, Philadelphia, USA	2012
2	David G	Medical Microbiology	Elsevier, UK.	2007
3.	Anna M. Wobus and Kenneth Boheler	Stem cells	Springer Science & Business media	2006
4.	Mathew Sebastian and NeethuNihan	Nanomedicine and drug delivery	CRC Press	2012
5.	Schmidt R.F. and Thews G	Human Physiology	Springer Science & Business media	2013

#### **REFERENCE BOOKS:**

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Murray P, Rosenthal K	Medical Microbiology (8 thed)	Elsevier, UK	2015
2	JuditPongracz, Mark keen.	Medical Biotechnology	Elsevier, UK	2009
3	U Satyanarayana	Biotechnology	Books and allied (p)limited	2013
4	AdeyemiOlubummo	Human anatomy and Physiology	Universe	2010
5	EvgenijBorisovicBabskij	Human Physiology	Mir Publishers	1975

#### **WEB SOURCES:**

1. <https://www.youtube.com/watch?v=zFxHhRobC0g>
2. <https://www.youtube.com/watch?v=BxEoX6TkitY>
3. <https://www.youtube.com/watch?v=vOnNk2EFLcE>
4. <https://www.youtube.com/watch?v=mYWVi7B-13c>
5. <https://www.youtube.com/watch?v=2Zfvey5lEW8>

#### **Syllabus Designer:**

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