CORE II

CELL BIOLOGY AND GENETICS

Semester	Subject Code	Category	Lecture		Theory		Practical		Credit
			Total hrs	Hrs/ week	Total hrs	Hrs/ week	Total hrs	Hrs/ week	
II		Core	75	5	75	5	0	0	5

COURSE OBJECTIVES

To enable the students to understand the basics of Cell Biology and Genetics

COURSE OUTCOMES

On the successful completion of the course, students will be able to acquire a sound knowledge about generating, processing and understanding biological genetic information.

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	To understand about the anatomy, cell division & Cell differentiation of the microorganisms.	K2
CO2	To understand about the properties and functions of genes through Mendelian inheritance studies.	K2
CO3	To understand about the methods of gene transfer.	K2
CO4	To understand about the plasmids, their functions & uses in microbiology.	K2
CO5	To understand about the occurrence of mutation & its detection in microorganisms.	K2

MAPPING WITH PROGRAMME OUTCOMES:

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

S- Strong; M- Medium; L- Low

Unit-I: Cell biology **(15 Hrs)**

Structure and function of cells and intracellular organelles of both prokaryotes and eukaryotes. Mechanism of cell division (Mitosis) - cell differentiation - cell interaction - microbial cell membrane & its functions – bacteria [Gram positive & Gram negative].

Unit- II: Microbial Genitics **(15 Hrs)**

Genetic inheritance; Microbial genome – structure and function; Linkage and Crossing over; Extra chromosomal inheritance (mitochondria). Epigenesis; Genotypic and phenotypic characteristics – bacteria.

Unit III: Microbial Gene transfer mechanisms **(15 Hrs)**

Gene transfer mechanisms: Transformation – Griffith experiment; Conjugation – F^+, F' & Hfr methods; Transduction – Generalized and specialized.

Unit-IV: Plasmids and Genetic recombination **(15 Hrs)**

Plasmids – general properties: size, copy number, compatibility, origin of replication, conjugation and amplification. Classification of Plasmid – Col plasmids, resistant plasmids, degradative plasmids, virulent plasmids (Ti plasmid) & cryptic plasmids. Episomes , Transposons. Molecular mechanism of genetic recombination

Unit-V: Mutagenesis and mutation **(15 Hrs)**

Mutagenesis – mutation and its molecular basis – types of mutation – Addition, deletion, reversion, lethal, transition, transversion, frameshift, point and non-sense mutations. Mutation repair mechanisms – excision repair, post replication repair, recombinational repair and SOS repair. Detection and isolation of mutants - Isolation of auxotropic mutants; Carcinogenecity testing – Ames test.

TEACHING METHODOLOGY:

- **Lectures**
- **Power point presentation**
- **Charts**
- **Models**
- **Group discussion**
- **Group assignments**

TEXT BOOKS:

Sl no:	Book name	Author	Publisher	Year of publication
02	DNA repair and mutagenesis	Friedberg E.C., Walter GC, Sied. W	ASM press	1995
03	The Genetics of Bacteria and their Viruses	William Hayes	Blackwell Scientific Publishers	1985
04	Principles of Genetics	Gardner, E.J. Simmons, M.J and D.P Snustard	John Wiley & Sons	1991
05	Principles of Genetics	Robert H. Tamarin	Tata McGraw Hill Publication	2004
06	Cell and Molecular Biology	Gerald Karp	John Wiley & Sons	2002
07	Genetics	Peter J Russell	Benjamin Cummings	2002
08	Principles of Genetics	Peter Snustard D., Michael J. Simmons	John Wiley & Sons	2003
09	Genetics	Ahluwalia, K.B	New Age International Pvt., Ltd	1996

REFERENCE BOOKS:

Sl No:	Book name	Author	Publisher	Year of publication
01	Molecular Biotechnology	Glick, B.R. and Pasternak, J.J.	ASM Press	1994
02	Molecular Cloning – A Laboratory Manual	Sambrook, J. and Ruseell, D.W.	Cold Spring Laboratory Press	2001

WEB SOURCES:

http://www.molgen.mpg.de/

http://www.cellbio.com/

http://restools.sdsc.edu/

http://www.mcb.harvard.edu/biolinks.html

http://www.horizonpress.com/gateway

SYLLABUS DESIGNER:

1. Mrs. A. Barathi, Assistant Professor
2. Dr. A.Vidhya HOD & Assistant Professor