

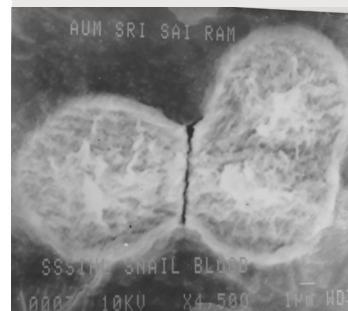
# 19BT211 GENETICS

Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P	W/RA	SSH/HSH	CS	SA	S	BS
45	-	30	10	45	1	10	2	2



## COURSE DESCRIPTION AND OBJECTIVES:

The course provides knowledge in genetics and equip students understand the genetic basis of diseases and prevention. It also enables students to understand molecular mechanisms through which genes cause diseases.

## COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Accomplish the genetic basis of heredity by linkage mapping.	4,9
2	Attain knowledge on organization and packing of chromosome and its functions.	4,5,9
3	Enable to understand the structure of DNA, mutations and cloning strategy.	5,6,8,9
4	Comprehend the basics of population genetics and epigenetics.	4,7

## SKILLS:

- ✓ Solve genetic problems related to Mendelian laws of inheritance.
- ✓ Mapping of chromosomes.
- ✓ Experimental methods to prove the DNA as a genetic material.
- ✓ Karyotype in human chromosomes.

**UNIT - I****L-9**

**PHYSICAL BASIS OF HEREDITY:** Historical perspectives of genetics; Mendelian laws/Basic laws of inheritance - monohybrid, dihybrid and trihybrid cross; Modification of Mendel's ratios due to gene interactions; Multiple alleles and lethality; Multiple factors of inheritance; Probability in Mendelian inheritance; Genotyping by molecular markers and the concept of linkage, crossing over and gene mapping.

**UNIT - II****L-9**

**GENETIC MATERIAL AND ITS ORGANIZATION:** Identification of the genetic material; Classical experiments - Hershey-Chase, Avery–MacLeod–McCarty and Meselson-Stahl; Packing and organization of genetic material in prokaryotes and eukaryotes; Chromosome morphology, Classification and karyotyping; Special chromosomes.

**UNIT - III****L-9**

**BACTERIAL GENETICS AND EXTRA CHROMOSOMAL INHERITANCE:** Conjugation, Transformation and transduction; Introduction of DNA into the bacterial cells; Cloning in *E. Coli*; Gene transfer to animal and plant cells; DNA mediated transformation; Phages as genetic material and their life cycles; Retroviruses, Influenza; Extra chromosomal inheritance.

**UNIT - IV****L-9**

**GENE STRUCTURE AND MUTATIONS:** Spontaneous and induced mutations and types of mutations; Chromosomal aberrations; Molecular basis of genetic diseases and applications; Fine structure of genes in prokaryotes and eukaryotes; Genetic control of development in *Drosophila* and *C. elegans*.

**UNIT - V****L-9**

**CONCEPTS OF HUMAN GENETICS:** Introduction - population genetics and epigenetics; Human chromosomes and chromosome variation in number; Mechanisms of sex determination and differentiation.

**TEXT BOOK:**

1. P.K. Gupta, "Genetics", 3<sup>rd</sup> edition, Rastogi Publications, 2005.

**REFERENCE BOOKS:**

1. E. J. Gardner, M.J. Simmons and D. P. Snustad, "Principles of Genetics", 8<sup>th</sup> edition, Wiley India, 2007.
2. M.W. Strickberger, "Genetics", 3<sup>rd</sup> edition, Prentice Hall of India Publications, 2006.