

# SYLLABUS

PANJAB UNIVERSITY, CHANDIGARH

B.Sc. (General) – IIIrd year Examination

SEMESTER-VI

Paper – I : Genetics (Code — ZOO-601)

## UNIT-I

- **Mendelism and Mendelian Ratios.**
- **Modifications of Mendelian Ratios :**  
Non-allelic genic interactions, modified  $F_2$  ratios (9 : 7; 9 : 3 : 4; 9 : 3 : 3 : 1; 12 : 3 : 1; 13 : 3; 15 : 1 and 9 : 6 : 1).
- **Gene modifications** due to Incomplete dominance. Lethal factors (2 : 1) and Pleiotropic genes.
- **Multiple alleles :** Blood group inheritance; eye-colour in *Drosophila* and Pseudo-allelism.
- **Multiple factors :** Qualitative and quantitative characters; inheritance of quantitative traits (e.g. skin colour in man).

## UNIT-II

- **Linkage, Crossing over and Recombination :** Linkage; sex-linked characters crossing over, frequency of crossing over, cytological basis of crossing over; synaptonemal complex; Recombination in fungi (Tetrad Analysis).
- **Gene and Genetic Code :** Structure of nucleic acids (DNA and RNA); Replication of DNA and transcription; Expression of gene (Protein synthesis in Prokaryotes and Eukaryotes); Properties of Genetic code; codon assignment; Wobble hypothesis.
- **Extra-nuclear inheritance :** Kappa particles in *Paramecium*.

## UNIT-III

- **Mutations :** Spontaneous and induced mutations; Physical and chemical mutagens; Detection of mutations in *Drosophila*.
- **Inborn errors of metabolism in man :** (Phenylketonuria, Alcaptonuria and Albinism); Somatic mutations and carcinogenesis.
- **Regulation of gene expression** in prokaryotes (operon model) and in eukaryotes.

## UNIT-IV

- **Population Genetics :** Equilibrium of gene frequencies and Hardy-Weinberg Law.
- **Genetic recombination in bacteria** (Conjugation, Transduction and Transformation); Plasmids.
- **Applied Genetics :** Recombinant DNA; Genetic cloning and its applications in medicine and agriculture; DNA finger printing.

# SCHEME OF EXAMINATION

## SEMESTER-VI

Nomeclature of Paper	Time	Theory Paper	Internal Assessment	Total Marks
Paper-I : Genetics (Code : ZOO-601)	3 Hours	36	04	40

### INSTRUCTIONS FOR SETTING OF THEORY PAPER

- Nine questions are to be set.
- Question No. 1 is compulsory consisting of short answer type questions covering the whole syllabus. It will have 8 parts of one mark each.
- Two questions are to be set from each unit. One question is to be attempted from each unit.
- 50% of the questions are to be split into 2-4 sub-parts.
- In all, five questions are to be attempted including the compulsory one.