

B.Sc. Forensic Science: Semester - VI

EST607: Botany - VI

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 outcomes:

After the completion of the course the students will be able:

- Acquire knowledge on ultrastructure of cell.
- Understand the structure and chemical composition of chromatin and concept of cell division.
- Interpret the Mendel's principles, acquire knowledge on cytoplasmic inheritance and sex linked inheritance.
- Understand the concept of 'one gene one enzyme hypothesis' along with molecular mechanism of mutation.
- Interpret the concept of Lemarkism, Neo Lamarkism, Darwinism and also understand the concept of natural selection.

Unit I – Cell biology

- Structure and function of cell wall, plasma membrane, ribosomes, Endoplasmic reticulum, golgi apparatus, mitochondria, chloroplast, lysosomes, peroxisomes and cell inclusions - Organization of nucleus: nuclear envelope, nucleoplasm and nucleolus. Chromosomal nomenclature- chromatids, centromere, telomere, satellite, secondary constriction. Organization of chromosomes- Nucleic acid and histones- types and classification. Lampbrush chromosomes and polytene chromosomes- Karyotype and idiogram. Cell cycle: G0, G1, S and G2 phases – mitosis: open and closed mitosis – amitosis - meiosis. Variation in Chromosome number (Numerical aberrations)- aneuploidy and Euploidy-haploidy, polyploidy- significance (Structural aberrations) - deletion, duplication, inversion and translocation.

Unit II – Genetics

- Chromosome theory of inheritance, crossing over and linkage; Incomplete dominance and codominance; Interaction of Genes; Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Polygenic inheritance; Extra-nuclear Inheritance, Linkage, crossing over, Concept of sex determination and Sex chromosomes; Patterns of Sex determination in plants

Unit III – Plant breeding

- Plant introduction. Agencies of plant introduction in India, Procedure of introduction -Acclimatization – Achievements, Selection - mass selection, pure line selection and clonal selection. Genetic basis of selection methods, Hybridization: Procedure of hybridization, inter generic, inter specific, inter varietal hybridization with examples. Composite and synthetic varieties, Male sterility, Heterosis and its exploitation in plant breeding, Mutation, Molecular Breeding (use of DNA markers in plant breeding), achievements in India, Breeding for pest, pathogenic diseases and stress resistance.

Unit IV – Plant tissue culture

- Principles, components and techniques of in vitro plant cultures, Callus cultures, Cell culture, cell suspension cultures, Embryogenesis and organogenesis, Protoplast- isolation and culturing of

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protoplast principles and application, regeneration of protoplasts, protoplast fusion and somatic hybridization, selection of hybrid cells, Somaclonal variation, Plant secondary metabolites production

Unit V - Biostatistics

- Definition, statistical methods, basic principles, variables- measurements, functions, limitations and uses of statistics. Biometry Data, Sample, Population, random sampling, Frequency distribution- definition only, Central tendency - Arithmetic Mean, Mode and Median; Measurement of dispersion- Coefficient of variation, Standard Deviation, Standard error of Mean; Test of significance: chi-square test for goodness of fit. Computer application in biostatistics - MS Excel and SPSS

Suggested Readings:

1. G.M. Cooper. (2015). *The Cell: A Molecular Approach*, 7th Edition. Sinauer Associates.
2. Alberts, B., Johnson, A.D., Lewis, J., Morgan, D., Raff, M., Roberts, K., Walter, P. (2014). *Molecular Biology of Cell*, 6th Edition. *W.W. Norton & Co.*
3. Campbell, M.K. (2012). *Biochemistry*, 7th ed., Published by Cengage Learning.
4. Campbell, P.N. and Smith, A.D. (2011). *Biochemistry Illustrated*, 4th ed., Published by Churchill Livingstone
5. Tymoczko, J.L., Berg, J.M. and Stryer, L. (2012). *Biochemistry: A short course*, 2nd ed., W.H. Freeman.
6. Berg, J.M., Tymoczko, J.L. and Stryer, L. (2011). *Biochemistry*, W.H. Freeman and Company
7. Nelson, D.L. and Cox, M.M. (2008). *Lehninger Principles of Biochemistry*, 5th Ed., W.H. Freeman and Company.
8. Karp, G. (2010). *Cell Biology*, John Wiley & Sons, U.S.A. 6th edition.
9. Hardin, J., Becker, G., Skliensmith, L.J. (2012). *Becker's World of the Cell*. 8th edition. Pearson Education Inc. U.S.A.)
10. Gardner, E.J., Simmons, M.J., Snustad, D.P. (1991). *Principles of Genetics*, John Wiley & sons, India. 8th e
11. Snustad, D.P. and Simmons, M.J. (2010). *Principles of Genetics*, John Wiley & Sons Inc., India. 5th edition.

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