

## Biochemistry, Endocrinology and Animal Behaviour

Course Code: BEB 409

Credit: 04 (L-3, T-1, P-0)

Contact Hours: 60

MM: 100

### Course Objectives:

1. To learn out the major ideas and current experimental approaches to cell and developmental biology, and in the process will illustrate how molecular approaches complement classical cell biology in finding out the details of how cells carry out their basic processes.
2. To learn the knowledge the spread of genes through populations and the role of natural selection in predator-prey relationships, polymorphism and mimicry.
3. To study the phenomenon of dominance, laws of segregation, independent assortment of genes.
4. To understand the different types of genetic interaction, incomplete dominance, codominance, inter allelic genetic interactions, multiple alleles and quantitative inheritance etc.
5. Understand the biochemical nature of nucleic acids, their role in living systems, experimental evidences to prove DNA as a genetic material.

**Unit 1. Concept and theories of evolution:** Basic concept of Evolution, Origin of life, evidences of evolution  
**Mendelian genetics and its extension:** Mendel's experiments and Principles of Inheritance, Chromosome theory of inheritance, Incomplete dominance and co-dominance, Multiple alleles, Lethal alleles, Epistasis, Pleiotropy.

**Unit 2. Linkage, crossing Over and Chromosomal Mapping:** Linkage and crossing over, Recombination frequency as a measure of linkage intensity, two factor and three factor crosses, Interference and coincidence, chromosome mapping, Somatic cell genetics - an alternative approach to gene mapping.


**Unit 3. Population Genetics:** Allele frequencies, Genotype frequencies, Hardy-Weinberg Law, role of natural selection, mutation, genetic drift.

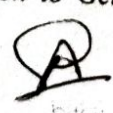
**Unit 4. Sex Determination and extranuclear inheritance:** Sex determination in *Drosophila*: Chromosomal theory, origin of Gynanders and Intersexes, Genic balance. Sex determination in human: Gene Dosage Compensation and Molecular basis of X-chromosome inactivation, sex linked inheritance. Cytoplasmic inheritance: Sigma factor in *Drosophila*, Kappa particle inheritance. Chromosomal aneuploidy in human beings. , Theories of evolution: Lamarckism/ Neo- Lamarckism, Darwinism/ Neo-Darwinism, Mutation theory and Modern synthetic theory.

**Unit 5. Mechanism of evolution:** Organic variations, Isolating Mechanisms, Natural selection (Example: Industrial melanism). Types of natural selection (Directional, Stabilizing, Disruptive), Artificial selection, Speciation: concept and modes

### Suggested readings:

1. Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). *Principles of Genetics*. VIII Edition. Wiley India
2. Snustad, D.P., Simmons, M.J. (2009). *Principles of Genetics*. V Edition. John Wiley and Sons Inc.
3. Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). *Concepts of Genetics*. Edition. Benjamin Cummings.
4. Russell, P. J. (2009). *Genetics- A Molecular Approach*. III Edition. Benjamin Cummings.
5. Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. *Introduction to Genetic Analysis*. IX Edition. W. H. Freeman and Co.
6. Ridley, M. (2004). *Evolution*. III Edition. Blackwell Publishing.

  
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