Physiology & Toxicology, Genetics and Biotechnology

Course Code:BEB 609 **Credit: 04 (L-3, T-1, P-0)**
Contact Hours: 60 **MM: 100**

Course Objective

1. To introduce the different anatomical feature of animals and its significance.
2. To learn the comparative account of anatomy of vertebrates.
3. To explore the evolutionary background of different physiological advancement in different animal groups.
4. To study the anatomical adaptations of animals in relation to their habit and habitat.
5. To learn the workability of major organs and organ systems of animals.
6. To study the basic principles of genetics and biotechnology.

Course Outline:

UNIT I Excretion: Structure of nephron, Physiology of Urine formation; Muscle: Types, Neuron - Structure and function, Origin and conduction of nerve impulse, Synapse and synaptic transmission.

UNIT II: Classification of toxicants, Dose-effect and dose response relationship; Biological and chemical factors that influence toxicity; Toxic agents and their effects: Pesticides and Heavy Metals; Determination of LC50 and LD50 Values, Bioaccumulation and biomagnifications.

UNIT III: Mendel's experiments and principles of inheritance, test and back cross; multiple alleles in man (ABO blood group); Linkage: complete and incomplete linkage; Crossing over: three-point mapping method, significance of crossing over; Sex linked inheritance.

UNIT IV: Mutation: types of mutation, types of mutagen-physical & chemical. Molecular basis of mutation(transition, transversion, base pair substitution, & frame shift mutation).

UNIT V: General characteristics of the cloning vectors used in genetic engineering, plasmid vectors viz PER 322, pUC plasmids, M13 vectors, lamda vectors, cosmids, phagemids. Restriction enzymes used in recombinant DNA Technology endonucleases, ligases and other enzyme useful in gene cloning.

UNIT VI: Use of biotech in genetic engineering (concept and recombinant DNA technology) and its applicationin agriculture & medical areas.

Suggested readings

Principles of Animal Physiology- C. D. Moyes and P. M.

- Principles of Anatomy and Physiology- G. J. Tortora and B. H. Derrickson
- Animal Physiology – Adaptation
- & Environment – K. Schmidt-Neilson (Cambridge University Press) Text Book of Medical Physiology – A. C.Guyton (Holt Saunders)
- Fundamentals of Toxicology- P. K. Gupta
- Toxicology- V.C Kapoor• Text book of Genetics- Veerbala Rastog

i• Genetics – Gardener

- Principles of Genetics- Snustad, D.P. and Simmons, M.J. (John Wiley• & Sons Inc.) Concepts of Genetics –W. S. Klug and M. K. Cummings (Pearson)• Genetics – V. B. Rastogi (Kedarnath Ramnath)• Genetic Engineering – P. S. Verm• & V. K. Agarwal (S. Chand) Molecular Biology.

Course Outcomes:

After completing the course, the students will be able to:

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1. Understand the cell division, chromosome segregation and chromosome structure.
2. Understand the structure of nucleic acids, gene expression, mutation, selection and migration.
3. Understand the gene expression and gene regulation in Eukaryotes.
4. Explore the applications of gene mutation, repair and breeding methods in plants
5. Understand nuclear genome organization as well as genes and gene numbers.

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