Course Code:

Chordates and Comparative Anatomy & History

Course Code: BEB 309 **Credit: 04 (L-3, T-1, P-0)**
Contact Hours: 60 **MM: 100**

COURSE OBJECTIVES

1. To introduce and classify different types of biomolecule.
2. To explore about structure and function of proteins in living system.
3. To learn about structural and physiological role of carbohydrates in living beings.
4. To study metabolism of lipids and their physiological role in organisms.
5. To learn about the enzymes, their mode of action and mechanisms of regulation.
6. To study the details of basic metabolic processes of energy production.

Physiology and Biochemistry

Unit 1 Physiology of digestion, respiration and circulation: Digestive System - Mechanical and chemical digestion of food; Role of gastrointestinal hormones; Control and action of GI Tract secretions; Absorptions of carbohydrates, lipids, proteins, water, minerals and vitamins, Respiration: Blood pigments: Role in oxygen transport, Oxygen dissociation curves and their physiological significances, Transport of CO2, Bohr and Haldane effect, Chloride shift, Circulation: Origin and conduction of cardiac impulse, Cardiac cycle, Blood volume, cardiac out-put, Blood pressure and its regulation; Electrocardiogram, Autonomic control and chemical regulation of heart rate

Unit 2 Physiology of excretion and nerve conduction: Excretion: Structure of nephron, Physiology of Urine formation, Composition of normal urine, Muscle: Types, Ultra structure of striated muscle, mechanism of muscle Contraction , Neuron and glia - Structure and function ,Ionic distribution, Transmembrane potential, Ionic channels, Action potential, Origin and conduction of nerve impulse, Synapse and synaptic transmission

Unit 3 Biomolecules: Classification, Structure and properties of amino acids. Classification and biological function of proteins. Protein configuration: Primary structure, secondary structure (α-helix & β-pleated structure), Tertiary (Native) structure and structure of multimeric protein (quaternary structure). Classification & properties of carbohydrate, isomers of monosaccharides. Classification & properties of fatty acids. Structure and functions of triglycerols, membrane phospholipid, cholesterols, steroid hormones.

Unit 4 Enzyme and metabolism: Concept of enzyme and mechanism of enzyme action. Respiration: Types - Aerobic respiration, Anaerobic respiration, respiratory substrates, mechanism of respiration: Glycolysis, TCA cycle, terminal oxidation (Oxidative phosphorylation, Electron transport chain). Energy calculation (output) in prokaryotes / eukaryotes. Pentose phosphate pathway, Oxidation of saturated fatty acids, β-oxidation, oxidation of unsaturated fatty acids, α-oxidation.

Suggested readings

Animal Physiology:

1. Tortora, - G.J. and Derrickson, B.H. (2009). *Principles of Anatomy and Physiology*, XII Edition, John Wiley & Sons, Inc.

Registrar
Invertis University

Dean
Faculty of Education
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Head
Department of Education
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Course Code:

2. Widmaier, E.P., Raff, H. and Strang, K.T. (2008) *Vander 's Human Physiology*. XI Edition. McGraw Hill
3. Guyton, A.C. and Hall, J.E. (2011). *Textbook of Medical Physiology*. XII Edition. Harcourt Asia Pvt. Ltd/ W.B. Saunders Company

Biochemistry:

4. Berg, J. M., Tymoczko, J. L. and Stryer, L. (2006). *Biochemistry*. VI Edition. W.H Freeman and Co.
5. Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009). *Principles of Biochemistry*. IV Edition. W.H. Freeman and Co.
6. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009). *Harper'Illustrated Biochemistry*. XXVIII Edition. Lange Medical Books/Mc Graw3Hill.

Course Outcomes:

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

1. Describe the structure and function of bimolecules.
2. Determine the physiological role of carbohydrates, lipids and proteins in living beings.
3. Discuss the concept of enzyme, its mechanism of action and regulation.
4. Understand different aspects of metabolism related to carbohydrate and lipids.
5. Describe the basic processes involve in glucose breakdown to produce ATP.
6. Understand and apply the basic knowledge of biochemistry in daily life

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