GENERIC ELECTIVE COURSE -20

Concepts of Human Metabolism

Zoo-GE -20

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course	Department offering the course
		Lectures	Tutorial	Practical/ Practice			
Concepts of Human Metabolism Zoo-GE-20	**4**	**2**	**0**	**2**	**As per the Program Eligibility**	**Biology in Class 12th**	**Zoology**

Learning Objectives

The learning objectives of this course are to:

- Understand the concepts of various metabolic pathways.
- Obtain knowledge of the tissue metabolism and its regulation.
- Become conversant with the idea of enzyme specificity in metabolic pathways.
- Learn how the body adjusts to variations in the demand for energy.

Learning Outcomes

By studying this course, students will be able to:

- Comprehend the fundamental concepts of metabolism.
- Better appreciate the importance and functions of carbohydrates, lipids, proteins in human metabolism.
- Comprehend the concept and mechanism of enzyme action and its regulation.
- Appreciate the importance of high energy compounds, electron transport chain, synthesis of ATP under aerobic and anaerobic conditions.

SYLLABUS

THEORY **30 Hrs**

UNIT 1: Overview of Metabolism **4 hrs**

Concept of metabolism: anabolism and catabolism, general introduction of metabolic pathways; Regulation of metabolism (enzymatic and hormonal), compartmentalization of metabolism, Overview of digestion and absorption of carbohydrates, lipids and proteins.

UNIT 2: Metabolism of Carbohydrates **12 hrs**

Glycolysis, Citric acid cycle, Gluconeogenesis, Hexose Monophosphate pathway, Glycogen metabolism.

UNIT 3: Metabolism of Lipids and Proteins **9 hrs**

Lipids: Beta oxidation of fatty acids, Metabolism of Ketone bodies, Metabolism during starvation. Proteins: Concept of Ureotelism, Uricotelism and Ammonotelism, Transamination, Deamination, Nitrogen metabolism, Ketogenic and glucogenic amino acids.

UNIT 4: Electron transport System and ATP synthesis **5 hrs**

Biological Redox systems; Overview of mitochondrial respiratory chain: electron carriers, sites of ATP production, ATP synthesis vis Oxidative phosphorylation; Chemiosmotic THEORY, shuttle systems.

PRACTICALS **60 hrs**

(Laboratory periods: 15 classes of 4 hours each)

1. To qualitatively identify the functional groups of carbohydrates.
2. Estimation of total protein in given solutions by Lowry's method.
3. Separation of amino acids and lipids by chromatography.
4. Study the action of salivary amylase under optimum conditions.
5. To study biological oxidation using goat liver.

Essential/recommended readings

1. Stryer, L., Berg, J., Tymoczko, J., Gatto, G. (2019). Biochemistry (9th ed.). New York, WH: Freeman.
2. Nelson, D.L., Cox, M.M. (2017). Lehninger: Principles of Biochemistry (7th ed.), New York, WH: Freeman Company.

Suggested Readings

1. Voet, D., Voet. J. G. (2013). Biochemistry (4th ed.), New Jersey, John Wiley & Sons Asia Pvt. Ltd.
2. Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W. and Well, P.A. (2009). Harper's Illustrated Biochemistry. XXVIII Edition, International Edition, The McGraw- Hill Companies Inc.

NOTE: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.