## 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 (if any) |
|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical/ Practice | | |
| INTERMEDIARY METABOLISM (BCH-GE-10) | 04 | 02 | 0 | 02 | Class XII with Science and Biology | Basic courses allied to biological sciences |

**Learning Objectives**

The course aims to familiarise the learner with the pathways of fuel and energy metabolism with an emphasis on their interrelationship and integrated regulation.

**Learning outcomes**

On successful completion of the course learners will be able to:

1. Discuss the underpinnings of fuel metabolism
2. Describe the mechanism of ATP synthesis.
3. Discuss the biosynthesis and degradation pathways.
4. Evaluate the interrelationships of carbohydrate and lipid metabolism
5. Discuss the biosynthesis and degradation of amino acids and nucleotides
6. Correlate the integration of metabolism

**SYLLABUS OF GE-10**

**BCH-GE-10 : INTERMEDIARY METABOLISM**
**SEMESTER - V**

**2.2 Course Contents**

**Theory (Credit 2)**

**Total Hours : 30**

**Unit I**: **Carbohydrate metabolism** **(14 Hours)**

Glycolysis as a universal pathway, anaerobic glycolysis, fermentation, gluconeogenesis, reciprocal regulation of glycolysis and gluconeogenesis, Pentose phosphate pathway, Pyruvate dehydrogenase complex, oxidation of acetyl CoA. TCA cycle, amphibolic role, ATP calculation, Glycerol-3-phosphate and malate-aspartate shuttle.

**Unit II**: **Fatty acid catabolism** **(6 Hours)**

TAG as energy source, β oxidation of saturated fatty acids in mitochondria, Fatty acid activation and overview of regulation, formation of ketone bodies and metabolism

**Unit III: Amino acid and nucleotide metabolism** **(6 Hours)**

Transamination, Deamination, urea cycle and its regulation, Glucose-alanine cycle, Krebs bicycle, Nucleotide Biosynthesis - salvage pathways, Degradation.

**Unit IV Integration of metabolism** **(4 Hours)**

Metabolic shifts in absorptive, post absorptive, fasting and starvation states.

**2.3 Practical:**

**Credits: 2** **Total Hours : 60**

1. Estimation of blood glucose by GOD-POD method
2. Demonstration of alcohol fermentation by yeast.
3. Estimation of serum cholesterol.

4. Estimation of serum TAGs.
5. Estimation of urea in serum
6. Estimation of uric acid in serum

### 2.4 Essential readings:


1. Nelson, D.L. and Cox, M.M. (2017). Lehninger: Principles of Biochemistry (7th ed.).
W.H. Freeman & Company (New York), ISBN:13: 9781464126116 / ISBN:10-1464126119.
2. Berg, J.M., Tymoczko, J.L., Stryer L., (2012) Biochemistry 7th ed., W.H. Freeman and Company (New York); ISBN:10:1-4292-2936-5, ISBN:13:978-1-4292-2936-4.
3. Campbell, M.K., Farrel, S.O. (2012) Biochemistry 7th ed, S.O. Brooks/Cole, Cengage Learning (Boston); ISBN: 13:978-1-111-42564-7 ISBN:10:1-4292-2936-5.
4. An Introduction to Practical Biochemistry (1998) 3rd ed., Plummer D. T., Tata McGraw Hill Education Pvt. Ltd. (New Delhi), ISBN:13: 978-0-07-099487-4 / ISBN:10:0-07- 099487-0.


**Suggested Readings:**


1. Principles of Biochemistry (2013) 4th ed., Voet, Donald, Voet, Judith &Pratt, charlotte. Wiley & Sons, Inc. (New Jersey), ISBN:978-1-11809244-6.


## 3. Keywords

Catabolism, anabolism, Glycolysis, TCA, Glycogen metabolism, Gluconeogenesis, nucleotide metabolism, beta oxidation, salvage pathway and integration

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