

	by feedback inhibition, allosteric modulation, covalent modification, zymogen and isoenzymes	presentation mode. Practical assessment	any topic of interest relating to Enzymes. Internal assessment tests will be conducted.
IV	Students will learn applications of enzymes as reagents, markers in diagnostics, ELISA; Also use of enzymes in therapy, research and industries as immobilized enzymes	Teaching will be conducted through black board and power point presentation. Useful video clips will be shown for better clarity.	Regular oral evaluation will be done. Internal assessment tests will be conducted

(**Assessment tasks enlisted here are indicative in nature)

4. Keyword

Enzymes, Catalysis, Specific activity, Mechanism of action, Isoenzymes.

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

DISCIPLINE SPECIFIC CORE COURSE – 5

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		
Metabolism of Carbohydrates	04	02	-	02	-	-

Learning Objectives

The objective of this course is to provide an understanding of metabolism of carbohydrates and the enzymes involved in various metabolic pathways and regulation of carbohydrate metabolism in cells. The course also aims to outline the importance of such pathways in relation to metabolic defects.

Learning outcomes

Carbohydrates major biomolecules as building blocks in any organism. An understanding of the metabolism of these groups of molecules will help students to know the functioning of an organism as a whole. There are various degradation and synthesis pathways these molecules undergo based on the energy requirement of an organism so as to maintain body homeostasis. Detailed analysis of the pathways will provide an insight into the diseases caused by defects in metabolism highlighting the importance of the same. The metabolism of carbohydrate course will provide to undergraduate students:

- Concept of metabolism, characteristics of metabolic pathways and strategies used to study these pathways.
- Detailed knowledge of various pathways involved in carbohydrate metabolism with the enzyme involved and regulation.
- Diseases caused by defects in metabolism with emphasis on the metabolic control and cure of diseases.
- Understanding of various metabolic pathways in animals.

SYLLABUS OF DSC- 2

B.Sc. (HONORS) BIOCHEMISTRY (NEP STRUCTURE) BCH-DSC-202: METABOLISM OF CARBOHYDRATES SEMESTER – II

2.2 Course Contents

Theory

Credits: 2

Total weeks : 15

Unit 1 - Glycolysis and Gluconeogenesis (6 weeks)

Autotrophs, Heterotrophs, Metabolic pathways: catabolism, anabolism, ATP as energy currency, Glycolysis: overview, reactions, Regulation, inhibitors; feeder pathways for glycolysis, Galactosemia, Lactose intolerance. Cori and Cori cycle. Gluconeogenesis. Reciprocal regulation of Glycolysis and Gluconeogenesis.

Unit 2 - Fates of Pyruvate and Pentose phosphate pathway (2 weeks)

Fates of pyruvate: Anaerobic ATP production, fermentation. Pentose phosphate pathway: oxidative and non-oxidative arm and its importance. Relationship between glycolysis and pentose phosphate pathway.

Unit 3 - Glycogen metabolism (3 weeks)

Glycogen synthesis, glycogen breakdown, regulation of glycogen metabolism, glycogen storage diseases; Von Gierke, Pompe, Cori and McArdle.

Unit 4 - Citric acid cycle (4 weeks)

Overview of citric acid cycle, synthesis of acetyl Coenzyme A, Regulation of Pyruvate Dehydrogenase complex, enzymes of citric acid cycle, regulation of citric acid cycle, inhibitors, anaplerotic reactions, amphibolic nature. Diseases associated with metabolic irregularities. Overview of Starve feed cycle.

2.3 Practical:

Credits: 2

Total weeks : 15

1. Estimation of blood glucose in serum using ortho toluidine method
2. Estimation of blood glucose in serum using GOD-POD method (Glucose oxidase-Peroxidase)
3. Sugar fermentation by microorganisms.
4. Assay of salivary amylase.
5. Estimation of G-6 P by G6PDH
6. Continuous assay of Lactate Dehydrogenase

2.4 Essential readings

1. Principles of Biochemistry (2013) 6th ed., Nelson, D.L. and Cox, M.M., W.H. Freeman and Company (New York), ISBN:13:978-1-4641-0962-1 / ISBN:10:1-4641-0962-1.
2. Principles of Biochemistry (2013) 4th ed., Voet, Donald, Voet, Judith & Pratt, Charlotte. Wiley & Sons, Inc. (New Jersey), ISBN:978-1-11809244-6.
3. Textbook of Biochemistry with Clinical Correlations (2011) 7th ed., Devlin, T.M., John Wiley & Sons, Inc. (New Jersey), ISBN:978-0-470-28173-4.

Suggested readings

Berg, J.M., Tymoczko, J.L. and Stryer L., (2012) W.H. Biochemistry (7th ed.), Freeman and Company (New York), ISBN:10: 1-4292-2936-5, ISBN:13:978-1-4292-2936-4.

3. Teaching Learning Process and Assessment Methods Facilitating the Achievement of Course Learning Outcomes**

Unit No.	Course Learning Outcomes	Teaching and Learning Activity	Assessment Tasks
I	Students will learn the concepts of metabolism with an emphasis on glycolysis and gluconeogenesis	Traditional chalk and black board method, Audio visual presentation. Classroom discussion	Assignment, unit -test and practical assessment through experiment and case studies.
II	Students will learn about the fates of pyruvate and pentose phosphate pathways.	Traditional chalk and black board method with examples and reactions and experiments	MCQ based assignments, unit test and practical assessment through experiment

III	Students will learn about glycogen synthesis, breakdown and glycogen storage diseases.	Traditional chalk and black board method, Audio visual presentation. Classroom discussion	Internal assessment tests will be conducted, presentations will be assessed along with practical assessment.
IV	The students will learn about overview, enzymes and regulation of citric acid cycle. They will also learn briefly about hormonal regulation of carbohydrate metabolism and diseases associated with metabolic irregularities.	Revision of the previous classes will be conducted. Traditional chalk and black board method, Audio visual presentation	Assessment through midterm examination and internal assessment test.

(**Assessment tasks enlisted here are indicative in nature)

4. Keywords

Metabolism, Carbohydrates, Glycolysis, Citric acid cycle, Gluconeogenesis, Glycogenolysis. Glycogenesis, Pentose Phosphate Pathway

DISCIPLINE SPECIFIC CORE COURSE – 6:

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		
Basic Concepts of Cell Biology	04	02	-	02	-	-

Learning Objectives

This course will acquaint the students to the subject of Cell Biology and the types of cell divisions seen in the living system. It deals with the details of cell organelles and cell wall. It also explains the molecules which make up the matrix and the proteins which make the framework of the cell as cytoskeleton elements. It also introduces the various tools and techniques of cell biology which are used to study the cell.

Learning outcomes

After the completion of the course, the students will have: