

## INTERMEDIARY METABOLISM

Sem	Sub. Code	Category	Lecture		Theory		Practical		Credits
			Hrs/week	Hrs/sem.	Hrs/week	Hrs/sem.	Hrs/week	Hrs/sem.	
II	21CPBC2B	Core	3	45	3	45	-	-	3

### COURSE OBJECTIVE

To reflect the latest advances in Biochemistry those are important to medicine on the structural basis of main Biomolecule including the regulation and control of biological mechanism

### COURSE OUTCOMES :

On the successful completion of the course, the students will be able to,

CO Number	CO Statement	Knowledge Level (K <sub>1</sub> – K <sub>4</sub> )
<b>CO1</b>	Understand the basics of electron transport chain, and component of oxidative phosphorylation	<b>K1</b>
<b>CO2</b>	To study the metabolism and regulation of Carbohydrates in mammals.	<b>K2</b>
<b>CO3</b>	This describes the Biosynthesis and regulation of protein and aminoacid metabolism	<b>K2</b>
<b>CO4</b>	This chapter deals with lipid metabolism and to determine the effect of dietary fat intake. Metabolism of ketone bodies and its regulations	<b>K3</b>
<b>CO5</b>	To learn the synthesis and regulation of Nucleic acids	<b>K4</b>

(\*CO – Course Outcomes

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze).

### MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO5	PO6
<b>CO1</b>	S	M	S	M	M
<b>CO2</b>	S	M	S	S	S
<b>CO3</b>	M	S	M	S	M
<b>CO4</b>	S	S	M	M	S
<b>CO5</b>	M	S	M	S	M

(S- Strong; M-Medium; L- Low)

## **UNIT I**

### **Electron Transport and Oxidative Phosphorylation**

**5 Hours**

High-energy phosphates- components of Electron Transport chain and the sequence of electron transport (Respiratory chain), Mechanism of ATP synthesis, oxidative phosphorylation – Chemiosmotic theory, uncoupling of oxidative phosphorylation. Mitochondrial transport system and Types of shuttle systems.

## **UNIT II**

### **Metabolism of carbohydrates and Regulation**

**10 Hours**

Introduction to metabolism of cells - Glycogenesis, Glycogenolysis, Glycolysis, and its energetics, amphibolic nature of TCA cycle and its regulation, Gluconeogenesis and their regulation. HMP Shunt, Cori cycle and Glyoxylate cycle. Metabolism of glycoproteins. Metabolism of fructose, galactose and its regulation

## **UNIT III**

### **Metabolism of Proteins**

**10 Hours**

Biosynthesis of non– essential amino acids, Degradation of amino acids-oxidative and non– oxidative deamination, transamination and decarboxylation, reactions of urea cycle and its significance. Catabolism of amino acids- ketogenic and glucogenic amino acid such as methionine, phenylalanine and tyrosine. Conversion of amino acids to special products (melanin, serotonin, dopamine).

## **UNIT IV**

### **Lipid Metabolism**

**10 Hours**

$\alpha$ ,  $\beta$ , and  $\omega$  oxidation of fatty acids and its regulation, Biosynthesis of saturated and unsaturated fatty acids. Lipoproteins and their metabolism. Biosynthesis of lecithins, cephalins, sphingomyelin, ceramides, cerebroside, gangliosides; metabolism of ketone bodies, cholesterol biosynthesis and regulation. Degradation of cholesterol.

## UNIT V

### Nucleic Acid Metabolism

10 Hours

Synthesis of purines and pyrimidines. De novo and salvage pathways, Biosynthesis of deoxyribonucleotides & inhibitors of nucleotide metabolism. Regulation of nucleotide biosynthesis. Degradation of purine and pyrimidines.

**DISTRIBUTION OF MARKS:** Theory - 100% and Problems – Nil

#### TEACHING METHODOLOGY:

- Black Board
- Power Point Presentations
- Assignments
- Models
- Demonstrations

#### Text Books:

S.NO	AUTHOR	TITLE	PUBLISHER	YEAR OF PUBLICATION
1	Murray, et al	Harper's Biochemistry	McGraw Hill	26 <sup>th</sup> edition (2003)

#### REFERENCE BOOKS:

S.NO	AUTHOR	TITLE	PUBLISHER	YEAR OF PUBLICATION
1	Campbell and Farrell	Biochemistry	Brooks/ Cole Pub Co	4 <sup>th</sup> edition. 2005
2	Davidson and Sittman	Biochemistry NMS	Lippincott. Williams and Willkins	4 <sup>th</sup> edition (1999)

3	Donald Voet, J.G Voet and John Wiley	Biochemistry	John Wiley & sons Canada, Ltd	2 <sup>nd</sup> edition (1995)
4	Kuchel and Ralston	Biochemistry	Schaum's outlines McGraw Hill	2 <sup>nd</sup> edition (1998)
5	Nelson Cox	Lehninger's principles of Biochemistry	McMillan Worth.	26 <sup>th</sup> edition (2003)
6	Stryer	Biochemistry	W.H.Freeman	6 <sup>th</sup> edition (2006)

#### **WEB SOURCES:**

- [http://www.biology.arizona.edu/cell\\_bio/cell\\_bio.html](http://www.biology.arizona.edu/cell_bio/cell_bio.html)
- [https://ecok.libguides.com/biology/web\\_sources](https://ecok.libguides.com/biology/web_sources)
- <https://www.nicholls.edu/biol-ds/biol155/Lectures/Cell%20Biology.pdf>
- <http://www.bio-nica.info/Biblioteca/Bolsover2004CellBiology.pdf>

#### **SYLLABUS DESIGNER:**

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- Ms.T. Nalini, Assistant Professor of Bio-Chemistry