SEMESTER III

BIOCHEMICAL BASIS OF NUTRITION

Sem	Subject Code	Category	Lecture		Theory		Credits
III	19CPFN3A	Core paper VII	Hrs/sem	Hrs/Per week	Hrs/sem	Hrs/Per week	5
			120	8	120	8	

Course Outcomes

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Gain basic knowledge of the structure and functions of the major carbohydrates.	K1,K2
CO2	Understanding the importance of lipids and its metabolism in human body	K3
CO3	Estimate different types of protein and their metabolic activities in human body.	K3
CO4	Analyze the major metabolic pathways and their regulation and the transmission of genetic information from DNA to proteins	K4
CO5	Apply and interpret analytical methods appropriate to the analysis of selected nutrients and enzymes in food.	K3,K4

***CO – Course Outcomes** (Each unit of the syllabus should have one course outcome statement)**

Knowledge level: K1 – Remember, K2-Understand, K3- Apply, K4-Analyse.

COS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	M	S	M	M	M
CO3	M	S	M	M	M
CO4	M	S	S	M	S
CO5	M	M	M	S	S

S-Strong; M-Medium, L- Low

SYLLABUS

BIOCHEMICAL BASIS OF NUTRITION

Objectives:

1. To enable the students to obtain depth in the study of Biochemistry of major nutrients and metabolic pathways.
2. Provides students with knowledge of nutrition biochemistry and the role of nutrients in human metabolism with emphasis on essential amino acids, essential fatty acids, vitamins, minerals, and selected bioactive substances.

UNIT I **24 Hours**

CARBOHYDRATES

Introduction, Classification. Structure and Properties of monosaccharides (hexoses and pentoses). Reactions of monosaccharides – oxidation, reduction and reaction with hydrogen cyanide, hydroxyl amine and phenyl hydrazine.
Oligosaccharides – Sucrose, maltose, lactose, isomaltose, cellobiose.
Homopolysaccharides - Structures of storage polysaccharides (Starch and glycogen).
Heteropolysaccharides – Structures of Hyaluronic acid, Heparin and Chondroitin sulphate.
Metabolism – Glycolysis, TCA cycle, HMP Shunt and energy production in the above pathways.
Oxidative phosporylation and Electron Transport Chain, Uronic acid pathway.
Glycogenesis and Glycogenolysis(SS)

UNIT II **24 Hours**

LIPIDS

Classification – Triglycerides (Fats), Phospholipids and other non-phosphorylated lipids – cerebrosides, gangleosides, sulfolipids.

Characterisation of fats. Rancidity of fats. Chemistry of Essential fatty acids.

Metabolism – Oxidation of fatty acids, biosynthesis of fatty acids (palmitic acid). ***Biosynthesis of triacyl glycerol, phospholipids (SS)***

UNIT III **24 Hours**

AMINOACIDS AND PROTEINS
Structure and classification of aminoacids.
Classification of proteins – denaturation
Metabolism – General breakdown of aminoacids, deamination, transamination, decarboxylation and urea formation.
Structure of proteins with special reference to insulin, myoglobin and haemoglobin (SS)

UNIT IV **24 Hours**

NUCLEIC ACIDS

Composition and function.

Structure and properties of DNA and RNA (t-RNA, m-RNA and r-RNA), minor RNA types.

Metabolism – Biosynthesis and breakdown of purine nucleotides.

Biosynthesis and breakdown of pyrimidine nucleotides.

Defects in nucleic acid metabolism (SS)

UNIT V **24 Hours**

ENZYMES

Classification of enzymes. IUB classification

Enzyme kinetics – Michaelis Menten equation.

Factors affecting enzyme activity (pH, temperature, substrate concentration and enzyme concentration).

Enzyme inhibition – Competitive, Non- competitive and Uncompetetive (Kinetics not necessary).

Clinical significance of enzyme assays (SS)

Distribution of Marks: Theory – 25 (IA) + 75 (univ. exam) = 100 Marks

REFERENCES

Text Books:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2003)	Harper's Illustrated Biochemistry, 26th edition	International Edition.	-
2	Deb, A.C,	Fundamentals of Biochemistry	New Central Book Agency (P) Ltd.	2002
3	Nelson, L. and Michael.M.Cox. ,	Lehninger Principles of Biochemistry, 4th Edition,	W.H. Freeman and Company, NewYork.	2005

Reference Books:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Palmer, T.,	Understanding enzymes, 4th Edition,	Prentice Halls, Ellis Horwood, London	1995
2	Voet, D., Voet, G.J. and Pralt, W.C.,	Fundamentals of Biochemistry, Upgrade edition,	John Wiley and Sons, Inc.	2002
3	West, E.S., Todd, W.R., Mason, H.Sand and Van Brugge, T.J.,	Biochemistry, 4th edition,	The Macmillan Company, London.	1966

TEACHING METHODOLOGY

- Lecture method
- Discussion method
- Using ICT
- Expeditionary learning involves "learning by doing" and participating in a hands-on experience.
- Laboratory experiments performed by more than two students working together
- Tutorial: students assigned to other students for assistance, peer teaching

SYLLABUS DESIGNER:

- Ms. R.TAMILSELVI, Head And Assistant Professor, Department Of Foods and Nutrition.