Sem	Subject Code	Category	Lecture		Theory		Practical	Credits
II	21CPFN2C	Core paper VI	Hrs/sem	Hrs/Per week	Hrs/sem	Hrs/Per week		5
			90	6	90	6		

ADVANCED NUTRITIONAL SCIENCE

COURSE OBJECTIVE:

1) To highlight the physiological and metabolic role of nutrients and their relationship to human health and wellbeing.

2) To understand the health problems associated with nutrient deficiency or toxicity

COURSE OUTCOMES

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

СО	CO Statement	Knowledge Level
Number		(K1-K4)
CO1	Understanding the concept of Carbohydrates	K2
	and Dietary fibre	
CO2	Learning about the lipids, proteins and amino	K2
	acids	
CO3	Learning about the micronutrients and	K2
	detoxification	
CO4	Understanding the importance of fluids, acid-	K2
	base balance and phytohemicals	
CO5	To get an insight into interrelationships	K3, K4
	between various metabolic pathways. To	
	become proficient for specialization in nutrition	

Knowledge level: K1 – Remember, K2-Understand, K3- Apply, K4-Analyse. **MAPPING WITH PO**

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

S-Strong; M-Medium, L- Low

UNIT-I

METABOLISM OF MAJOR NUTRIENT - CARBOHYDRATES

- A) Biological Membranes and Transport. Carbohydrates- Definition, classification, functions, maintenance of blood sugar levels, requirement, sources, digestion and absorption, Metabolism.
- B) Definition of Glycolysis, glycogenesis, glycogenolysis and gluconeogenesis. Elementary knowledge of biosynthesis of protein Electron transport chain and oxidative phosphorylation. Bioenergetics.
- C) Dietary fiber- Definition, classification, physiological effects and sources..

UNIT- II METABOLISM OF OTHER MACRONUTRIENT – LIPIDS, PROTEIN, AMINO ACIDS

A) Lipids- Definition, classification functions, sources, requirements, digestion and absorption. Essential fatty acids – Definition, functions, sources and effects of deficiency. Cholestrol metabolism. Definitions- Ketone bodies, ketogenesis and ketosis.

Proteins- Definition, composition, nutritional classification of proteins and amino acids, functions, sources, requirements, digestion and absorption. Evaluation of protein quality: PER, BV, NPU and Chemical score.

Amino acids- Types, Definition - deamination, transamination and decarboxylation. Urea production. Enzymes and co-enzymes- Definition, types, classification and factors affecting velocity of enzyme catalyzed reactions. BCAA and other Amino Acid Pool.

UNIT- III VITAMINS, MINERALS, SUPPLEMENTS, DETOXIFICATION

- A) Regulatory nutrients Water and Fat Soluble Vitamins. Macro, Micro and Trace minerals- Sources, Digestion, Absorption, Transport, and Storage Functions and Mechanisms of Action, Metabolism and Excretion, RDA, Deficiency and Toxicity.
- B) Health and nutrient claims in food and dietary Supplement. Detoxification Xenobiotics, enzyme systems involved mechanism of detoxification.

UNIT- IV

FLUIDS AND PHYTOCHEMICALS

A) Water: Body composition – extra- and intra- cellular fluid; Physiological functions; water balance and its regulation; Requirement and the sources; Nutritional and health problems due to deficiency or excess of water intake.

18 Hours

18 Hours

- B) Acid base balance: Acid-base balance in normal health, definition of buffers, principles of buffers, major sources of acid produced in the body, physiological buffer system and role of different buffersystems.
- C) Phytochemicals:Nonnutritivefoodcomponents and their potential health benefits: polyphenols, tannins, phytate, phytoestrogens, cyanogenic compounds, lectins and saponins.

UNIT- V 18 Hours INTERRELATIONSHIP BETWEEN NUTRIENTS AND ANTIOXIDANTS

- A) Oxidative stress and antioxidants Free radicals definition, formation in biological systems, defense against free radicals. Role of free radicals and antioxidants in health and disease Determination of free radicals, lipid peroxides and antioxidants
- B) Regulation of metabolism Interrelationship of carbohydrate, protein and lipid metabolism, Role of Vitamins and Minerals in Metabolism, metabolic adaptation during starvation, exercise, stress and diabetes mellitus.

S NO	AUTHORS	TITI F	PUBI ISHERS	VEAR OF
5.10	AUTIONS		I ODLISHEKS	PURI ICATION
1	Srilakshmi, B.	Food Science	New Age International (P) Ltd., Publishers, New Delhi.	2005
2	Potter, N. and Hotch Kiss, J.H.	Food Science, Fifth edition	CBS Publishers and Distributors, New Delhi	1996
3	Srilakshmi	Nutrition Science	New Age International Pvt. Ltd, New Delhi.	2008
4	Bamji, M.S., Rao, P.N. and Reddy, V.	Textbook of Human Nutrition	Oxford & IBH Publishing Co. Pvt. Ltd.	1996
5	Gibney and Michael.J	Nutrition Metabolism.	Blackwell Publishing USA.	2003

TEXT BOOKS:

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF
				PUBLICATION
1	Mahan L K and Escott	Krause's Food	WB Saunders	2000
	– Stump S	Nutrition and Diet	Ltd	
		Therapy 10th		
		Edition		
2	Gopalan, C	Recent Trends in	Oxford	1995
		Nutrition	University Press,	
			London.	

3	AmbikaShanmugam	Fundamentals of	KarthikPprinters	1992
		biochemistry for		
		Medical students		
		7 th Edition		
4	U.Sathyanarayana and	Biochemistry,	Uppala- Author	2007
	U.Chakrabani	Third Edition	Publishers	
5	Shils, M.E., Olson, J.,	Modern Nutrition	Williams and	2006
	Shike, M. and Roos, C	in Health and	Williams. A	
		Disease, 9th edition	Beverly Co.	
			London.	
6	Carolyn D. Berdanier,	Advanced	CRC Press	2009
	Janos Zempleni	Nutrition	Taylor & Francis	
		Macronutrients,	Group, LLC	
		Micronutrients and	-	
		metabolism.		
7	Bender and David	Introduction to	CRC Press.	2008
		nutrition and	USA.	
		metabolism, 4th		
		edition		
8	Geissler and Catherine	Human	Elsevier. UK.	2007
		Nutrition,11th		
		edition		
9	Mann and Jim	Essentials of	Oxford	2008
		Human	University	
		Nutrition,3rd	Press.UK.	
		edition		
10	Eastwood and Martin	Principles of	Blackwell	2003
		Human Nutrition	Publishing.USA.	

WEB SOURCES:

- 1. http://www.malecentrum.sk/data/att/166373.pdf
- 2. https://www.docsity.com/en/lecture-notes/subjects/food-science-and-technology/
- 3. https://www.coursehero.com/file/7062362/Advanced-Nutrition-Notes-Ch-1-3/

TEACHING METHODOLOGY

- Chalk and board teaching
- Study Assignment method
- Active learning method
- Group discussions
- PPT
- Seminars
- Other Group activity

SYLLABUS DESIGNER:

• Mrs. K. GOWTHAMI, Head And Assistant Professor, Department of Foods and Nutrition