

# 19FT101 FOOD BIO-CHEMISTRY AND NUTRITION

Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P	WA/RA	SSH/HSB	CS	SA	S	BS
45	-	30	25	45	-	-	5	5

## COURSE DESCRIPTION AND OBJECTIVES:

This course offers the students' knowledge on biological basis of nutrition, metabolic pathways, enzyme activity and mechanisms by which diet can influence health. The objective of this course is to empower the students with methods and techniques for molecular weight estimation of proteins, qualitative analysis of edible fats and oils and make nutrient profiles for balanced diet and health.

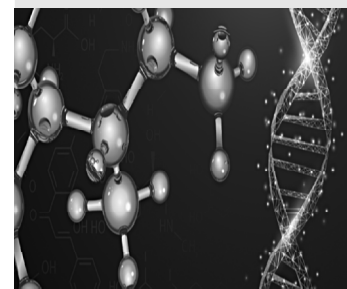
## COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Identify and analyse various pathways for carbohydrate metabolism.	2, 4
2	Investigate the cause and mechanism of lipid metabolism in cellular system.	4
3	Analyse the complex structure of protein and various nutritional parameters of protein.	2, 1
4	Analyse the enzyme reactions and investigate enzyme kinetics parameters.	4
5	Identify and design nutritional diet to ensure nutritional security for healthy, diseased, sports personnel, pregnant women and elderly persons.	2, 3

## SKILLS:

- ✓ Separation and molecular weight estimation of proteins.
- ✓ Quality analysis of edible fats and oils.
- ✓ Identify and recommend micro and macro nutrient profile for balanced diet and health.
- ✓ Enzyme activity measurement and determining the mechanism of the reaction.



Source:

<https://www.bioc.cam.ac.uk/news/images/2015/0-carousel-for-news-articles-2015.png/@images/5e11d637-eb30-4a1d-a202-d9ee01aa2e34.png>

**UNIT - I** **L-9**

**CARBOHYDRATE METABOLISM** : Classification; Structure and function of monosaccharides, disaccharides and polysaccharides; Metabolic pathways-glycolytic pathway, pentose phosphate pathway, citric acid cycle, electron transport chain, ATP balance, gluconeogenesis.

**UNIT - II** **L-9**

**LIPID METABOLISM** : Classification-structure and functions, essential fatty acids, digestion and absorption of lipids; Lipids - utilization of fats, biosynthesis of fatty acids and fats, clinical disorders associated with fats.

**UNIT - III** **L-9**

**PROTEIN METABOLISM** : Primary, secondary and tertiary structures of proteins; Metabolism of proteins (digestion and absorption); Nitrogen balance and nitrogen pool; Evaluation of quality of protein - biological value, net protein utilization, protein efficiency ratio, PDCAAS.

**UNIT - IV** **L-9**

**ENZYMES** : Definition; Function; Classification; Nomenclature; Co-enzymes and its function; Mechanism of enzyme action (lock and key method and Induced fit); Enzyme kinetics (Michaelis Menten equation) & environmental effects-enzyme inhibitions (Line weaver burk plot, competitive, uncompetitive and noncompetitive and mixed); Applications of enzymes in food industries.

**UNIT - V** **L-9**

**VITAMINS AND MINERALS** : Basic properties-occurrence, physiological functions of vitamins and minerals; Introduction to human nutrition - nutritive values of foods, basal metabolic rate, techniques for assessment of human nutrition; Diets and disorders - balanced diet, recommended dietary allowances for various age groups (according to physiological status, athletic and geriatric persons, pregnant and lactating women, etc.), deficiency diseases of different nutrients.

## LABORATORY EXPERIMENTS

**LIST OF EXPERIMENTS****TOTAL HOURS: 30**

1. Preparation of standard acid and alkali solutions.
2. Preparation of standard graph for quantification of biomolecules.
3. Verification of Beer-Lambert's law using colorimetry.
4. Acid hydrolysis and action of salivary amylase on starch.
5. Enzymatic hydrolysis of sucrose and measurement of optical rotation.
6. Testing creatinine activity.
7. Separation of proteins by SDS-PAGE.
8. Gelling properties of starch.
9. Specific gravity and oxidative rancidity of fat and oils.
10. Identification of proteins (Qualitative Tests)
11. To study general properties of the enzyme Urease & Achromatic time of salivary amylase.
12. Blood glucose estimation.
13. Determination of carbohydrate by anthrone method.
14. Determination of carbohydrate by DNS method.
15. Determination of Iodine Value for fats.

**TEXT BOOKS:**

1. M. M. Cox, "Lehninger Principles of Biochemistry". 4<sup>th</sup> edition. New York: Worth Publishers, 2000.
2. R. F. Boyer, "Modern Experimental Biochemistry", 3<sup>rd</sup> edition, Pearson Education, 2009.

**REFERENCE BOOK:**

1. D. Voet, J. G. Voet and C. W. Pratt, "Fundamentals of Biochemistry", 4<sup>th</sup> edition. John Wiley & Sons, 2013.