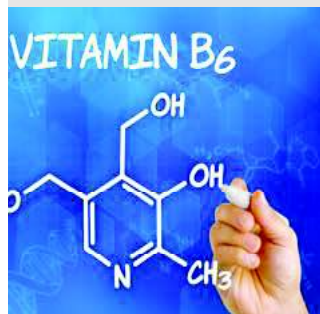


# 16FT101 BIOCHEMISTRY AND NUTRITION



Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P	WA/RA	SSH/HSH	CS	SA	S	BS
45	-	20	5	45	2	12	2	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:

The student will be able to:

- describe the major metabolic pathways involved in the metabolism of nutrients in the human body.
- analyze the roles of biomolecules in metabolic reactions and relate metabolism with human nutrition.
- understand the basis of reactivity of biologically relevant molecules and their interactions.

## SKILLS:

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

**UNIT - 1**

**L-9**

**CARBOHYDRATE METABOLISM:** Metabolic pathways for breakdown of carbohydrates, Glycolytic pathway, Pentose phosphate pathway, Citric acid cycle, Electron transport chain, ATP balance, Gluconeogenesis.

**UNIT - 2**

**L-9**

**LIPID METABOLISM:** Essential fatty acids, Digestion and absorption of lipids. Lipids: Utilization of fats, Biosynthesis of fatty acids and fats, Clinical disorders associated with fats.

**UNIT - 3**

**L-9**

**PROTEIN METABOLISM:** Metabolism of proteins (digestion and absorption), Nitrogen balance and nitrogen pool, Evaluation of quality of protein.

**UNIT - 4**

**L-9**

**ENZYMES:** Definition, Function, Classification, Nomenclature & structure, Co-enzymes and its function; Mechanism of enzyme action, Enzyme kinetics & environmental effects, Enzyme inhibition.

**UNIT - 5**

**L-9**

**VITAMINS AND MINERALS:** Occurrence, Physiological functions of vitamins and minerals. Introduction to human nutrition, Nutritive values of foods, Basal metabolic rate, Techniques for assessment of human nutrition, Dietary requirements and deficiency diseases of different nutrients.

**ACTIVITIES:**

- *Report on food particle disintegration in a prototype stomach model..*
- *Review on starch modification methods and its applications in food industry.*
- *Estimation of RDA values for different micro and macro 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 Beer- Lambert's law using colorimetry.
4. Estimation of DNA and RNA by Spectrophotometric method.
5. Acid hydrolysis and action of salivary amylase on starch.
6. Enzymatic hydrolysis of sucrose and measurement of optical rotation.
7. Testing Creatinine activity.
8. Separation of proteins by SDS-PAGE.
9. Gelling properties of starch.
10. Specific gravity and Oxidative rancidity of fat and oils.

**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 BOOKS :**

1. L. Stryer, "Biochemistry", 3<sup>rd</sup> edition. Freeman & Co, New York. 2009.
2. D. Voet, J. G. Voet and C. W. Pratt, "Fundamentals of Biochemistry", 4<sup>th</sup> edition. John Wiley & Sons, 2013.

