17FT011 FOOD BIOCHEMISTRY AND NUTRITION

Hours Per Week :

L	T	P	C
3	1	-	4

Total Hours :

L	T	P
45	15	-

WA/RA	SSH/HSH	CS	SA	S	BS
15	30	-	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:

- 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:

- ✓ 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

UNIT – I

Basic Concepts of Carbohydrates: Structure and properties of Mono, Di, Oligo & polysaccharides, complex carbohydrates, Confirmation of pyranose & furanose ring, glycosidic bond, Glycogen, starch & dextran; as mobilizable stores of glucose. Cel lulose, glycoproteins, glycosaminoglycans & lectins; structure and function.

UNIT – II

Bioenergetics & Metabolism of Carbohydrate: Respiratory chain, Aerobic and anaerobic respiration. Glycolysis, Glucogenesis, Glycogenolysis, Gluconeogenesis, ED Pathway, Pentoses phosphate shunt & TCAcycle.

UNIT – III

Amino Acids: Amino acids - Classifications, Physico – Chemical Properties, Protein structure, folding & function, Nitrogen Cycle, Nitrogen Balance, reductive amination & transamination & Urea cycle. Synthesis of amino acids -Glutamate pathway; Serine pathway; shikimate pathway for the production of aromatic amino acids..

UNIT – IV

Lipids and their Metabolism: Classifications, Structures and roles of fatty acids; fatty acid breakdown; fatty acid synthesis; synthesis and metabolism of triglycerols, cholesterol structure and function. Lipoproteins – classification & function.

UNIT – V

Nutrition: Functions and energy of foods, basal energy metabolism, dietary allowances and standards for different age groups. Assessment of nutritional quality of foods, mineral and vitamins as functional constituents in human metabolism and deficiency diseases associated. Effect of processing on nutritive value of food. Vitamins and minerals: Classification, structure and role of vitamins in food. Aroma substances.

TEXTBOOKS:

1. Lehninger A.L, Nelson O.'L, M.M. Cox, "Principles of Biochemistry" 3rd ed., CBS Publications, 2005.
2. J.L. Jain, "Fundamentals of Biochemistry ", 7th ed., S.Chand Publishers, 2009.
3. Food: Facts and Principles-N. Shakuntala Manay, Shadksharawamis.
4. Fundamentals of Nutrition-L Loyd McDonald

REFERENCEBOOKS:

1. Voet D, Voet J. G, "Biochemistry", 3rd ed., John C Wiley and Sons, 1994.
2. L. Stryer, J.M. Berg, JLTymockzo, "Biochemistry" 5th ed., WH Freemen & Co., 2002.
3. K. Mathews, K.E. Van Holde, Kevin G Ahern, "Biochemistry", 3rd ed., Pearson education, 2005.

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 macronutrients