Course code	Course Name	L-T-P - Credits	Year of Introduction
FT203	Food Chemistry	3-1-0-4	2016

Prerequisite : Nil

Course Objectives

To study about the nutrients and their chemistry in food.

Syllabus

Introduction to chemistry, role of water - Carbohydrate; structure classification -Protein chemistry Lipids; fat chemistry - Vitamins and additives -Biological value; BMR

Expected outcome .

Students will be exposed to chemistry in food; detailed knowledge of carbohydrates, fats and proteins and their importance to human nutrition

Text Book:

1. Sivasankar, B, *"Food processing and preservation" Prentice – Hall of India Pvt. Ltd. New Delhi 2002.*
2. Srinivasan Damodaran, Kirk L. Parkin, and O.R. Fennema, E, *"Food Chemistry" 4 th Edition, CRC Press, New York2007.*
3. Chopra, H.K. and P.S. Panesar. *" Food Chemistry". Narosa, 2010*

References:

1. Charley, H, *"Food Science" John Wiley and Sons Inc., New York 1982.*
2. Birch, G.G., Brennan, J. G. and Parker, K. J, *"The Sensory Properties of Foods" Applied Science Publication, London 1977.*
3. Robinson, D. S*, "Food – Biochemistry and Nutritional Value" Longman Scientific and Technical, London 1987.*

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	**Introduction and water:** Importance of food, Scope of food chemistry - Introduction to different food groups: their classification and importance - Water -Structure of water molecule, types and properties of water, water activity and its importance , determination, water quality for food processing	9	15%
II	**Carbohydrates:** Chemistry of carbohydrates – composition and structure- Definition, classification, Simple Sugars: mono and disaccharides, Hygroscopcity & solubility, optical rotation, mutarotation; sensory properties-sweetness index, caramelization, Maillard reaction, Dextrose Equivalent, Degree of polymerisation; Sugar alcohols; Oligosaccharides: structure, nomenclature, occurrence, uses in foods. Polysaccharides: Starch- amylose and amylopectin-properties, thickening & gelatinization, modified starches, resistant starch, Dextrins and dextrans, Starch hydrolsates – Malto dextrins and dextrins; Pectins, gums & seaweeds- gel formation & viscosity. Fiber- Cellulose & hemicellulose;	10	15%

	Food sources, functional role and uses in foods.		
FIRST INTERNAL EXAMINATION			
III	**Protein:** Classification, structure and functions – Role of proteins and requirements –Amino acids-Definition, classification, properties Functions of proteins in foods – physical and chemical properties of proteins, Important protein sources– Milk, Meat, Fish, Egg and Cereal proteins – Texturized proteins; Food sources, functional role and uses in foods.	9	15%
IV	**Lipids:** Review of structure, composition & nomenclature of fats. Non-glyceride components in fats & oils; Properties of fats & oils: crystal formation, polymorphism, melting points, plasticity, isomerisation, unsaturation; Modification of fats: hydrogenation- cis and trans isomers, inter-esterification, acetylation, Hydrolytic rancidity & oxidative rancidity; radiolysis Shortening power of fats, tenderization, emulsification, polymerization; Fat replacements; Food sources, functional role and uses in foods	10	15%
SECOND INTERNAL EXAMINATION			
V	**Vitamins and additives:** Definition –Classification, general sources, structure, properties, functions and dietary requirements – deficiency symptoms of vitamins A,D,E,K,C thiamins, riboflavin, niacin and biotin- role of minerals – Food colours and flavors – Food additives – classification and purpose – Role of thickeners, sweeteners, stabilizers, emulsifiers, leaveners, colours, flavouring agents, preservatives – examples.	9	20%
VI	**Biological Value:** BMR – specific dynamic action caloric value of foods. Computing caloric requirements balanced diet – carbohydrate factor – Glycemic Index, fat in the diet. Protein nutrition. Essential Amino Acids. Nitrogen Balance – Quality of protein – Biological value of protein – Protein Malnutrition – Obesity – Vitamins & Minerals requirements	9	20%
END SEMESTER EXAM			

Question paper pattern: Max. marks: 100, Time: 3 hours

The question paper shall consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks

Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.