FOOD CHEMISTRY

Course Code: 0711-2101	**Course Title:** Food Chemistry	
Course Type: Compulsory	**Level/Term:** Level 2, Term 1	**Pre-requisite (s):** 0531-1201
Credit: 3.0	**Contact Hours: 2.5 Hrs/Week**	**Total Marks: 100 (CIE: 35, SMFE:65)**

Rationale of the Course: This course provides the best understanding of the most important food components, including their properties and reactions. This course will also demonstrate sufficient knowledge of food chemistry to control reactions and developments in foods.

Content of the Course:

Sl No	Course Content (As Summary)	Hrs	CLOs
1	**Introduction to Chemistry of Foods:** Composition of food and factors affecting quality of foods, Chemistry of Functional groups. **Water:** Water and its interaction with food components and food stability, WLF equation, phase transitions of food containing water. **Carbohydrates:** Features and classification of carbohydrates, Chemical Characteristics of sugar, dextrin, pectin, and gums and agers, starch, glycogen, cellulose, hemicellulose, and chitin. Carbohydrate digesting enzymes, gelatinization and retrogradation properties of starch. Dietary fiber and pectin substances: their occurrence structure, properties and use in foods.	9	CLO1
2	**Chemistry of Amino Acids and Proteins:** Composition of proteins, classification, essential amino acids, physical and chemical properties of proteins. Structure and functional properties of proteins in foods, hydrolysis of proteins, major food proteins and their sources, changes in proteins during processing, determination of proteins.	9	CLO1
3	**Chemistry of Oils and Fats:** Physical and chemical properties and classification of lipids, essential fatty acid, rancidity and flavor reversion, processing of oil-bearing materials, refining of oils and fats, fat hydrolysis and interesterification, hydrogenation, shortenings and spreads. Fat replacer, essential oils, extraction and refining of oil, terpene oils and their use in foods.	9	CLO1

4	**Chemistry of Vitamins and Minerals:** Chemical composition, structure, stability and degradation. **Food Additives:** Definition, classification and function of food additives. Colorant, pH controlling agents, nutritive additives, acidulants, enzymes, antioxidants, preservatives, emulsifying and stabilizing agents, anti-caking agents, flavoring agents, thickeners, firming agents, flour bleaching agents and clarifying agents. Benefits and risks of using food additives. Pigments (carotenoids, chlorophylls, flavonoids, anthocyanins etc.)	9	CLO2
5	**Specific reactions of food components:** Browning reactions in foods, non-enzymatic browning, Pigment formation, Melanoidin, Maillard polymers, Caramelization, Ascorbic acid oxidation, Antioxidant activity of non-enzymatic browning products, Inhibition of non-enzymatic browning.	6	CLO3

Course Learning Outcomes: at the end of the Course, the Student will be able to-

CLO1	Demonstrate a comprehensive understanding of food components, their properties, and roles in food.
CLO2	Explain the chemistry of micronutrients and food additives
CLO3	Interpret significant chemical reactions occurring during food handling, processing, and storage, including those influencing food shelf life

Mapping of Course Outcomes to Program Outcomes-

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1	√											
CLO2		√										
CLO3		√										

Mapping Course Learning Outcome (CLOs) with the Teaching-Learning and Assessment Strategy

CLOs	Teaching-Learning Strategy	Assessment Strategy
CLO1	Brainstorming Sessions, Voice over PPT, Lecture Video, Open Discussion	Feedback Session, Q/A session, H5P (Interactive Content), Quiz, Midterm Examination

CLO2	Voice Over PPT, Lecture Video, Interactive Session	Q/A Session, H5P (Interactive Content), Quiz, Midterm Examination, Assignment
CLO3	Voice Over PPT, Lecture Video, Interactive Session	Q/A Session, H5P (Interactive Content), Quiz, Final Examination, Assignment

ASSESSMENT PATTERN

CIE- Continuous Internal Evaluation (35 Marks):

Class Tests	15
Assignments	5
Presentation	8
Class Attendance	7

SMEE- Semester Mid and End Examination (65 Marks):

Bloom's Category	Midterm Exam (25)	Semester End Examination (40)
Remember	5	10
Understand	5	10
Apply	10	10
Analyze	5	10
Evaluate		
Create		

LEARNING MATERIALS

Recommended Readings:

1. Oultate, T.P: Food – The Chemistry of its Components. The Royal Society of Chemistry, 2008, ISBN: 978-0-85404-111-4.
2. Michel J Gibney: Introduction to human nutrition. Willey Blacwell, 2009, ISBN: 9781444322965.
3. Food Science and experimental foods, Swaminathan, N. (1987) Ganesh Publications, Madras.
4. Food chemistry, Meyer L.M. (1969) Van Noustrand Reinhold co., New York.
5. Food Science, N. N. Potter.
6. Food Biochemistry, Charles Alias.
7. Foundations of Food Preparation, Peckham, C.G. (1979), The Macmillan co., London.