



FACULTY OF ENGINEERING & TECHNOLOGY

First Year Master of Technology

Semester I

Course Code: 102380102

Course Title: Advances in Food Chemistry

Type of Course: Core Course II

Course Objectives: To acquaint with properties and role of various constituents in foods, interaction and changes during processing. Relationships between the structure and functional properties of food molecules. Changes in the constituents of foods under the various processing conditions. Use of food additives to enhance the stability and quality of foods

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Internal		External		Total
				Theory	J/V/P*	Theory	J/V/P*	
3	0	2	4	30 / 15	20 / 10	70 / 35	30 / 15	150 / 75

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Water: Physical and Chemical Properties of Water: Structure and chemical properties. State of water in foods. Water activity; sorption behaviour of foods, energy of binding water, control of water activity of different food products in relation to their chemical, microbiological and textural properties.	6
2	Proteins: Classification, physical properties of proteins in relation to protein structure. Analytical methods. Basic properties: hydration, ionization, colloidal behaviour. Effects of food processing: changes occurring in chemical, functional & nutritional properties of proteins.	6
3	Lipids: Sources, structure and role of lipids in foods. Analytical methods. Chemical, nutritional and physical properties. Processing of fats and oils, degradation reactions. Rancidity development in oils: hydrolytic and oxidative	6
4	Carbohydrates: Classification of carbohydrate, basic chemistry, structure, properties and applications of monosaccharide, oligosaccharide and polysaccharide. Sugar derivatives. Browning and related reactions.	8
5	Pigments: Introduction, sources, classification and structure of pigments. Role of natural and synthetic pigments in foods. Effect of processing on pigments.	6
6	Food Additives: Introduction, classification, role of food additives in food processing, functions, safety evaluation of food additives, beneficial effects of food additives and toxic effects. Food preservatives, modified starches, flavouring agents, sweeteners, anticaking agents, humectants, surface active agents, antioxidants, chelating agents, colouring agents, bleaching and maturing agents.	7



Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks						R: Remembering; U: Understanding; A: Application, N: Analyze; E: Evaluate; C: Create
R	U	A	N	E	C	
20	25	25	15	10	5	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1	Damodaran, S., K. Parkin, O. R. Fennema, eds. 2007. Fennema's Food Chemistry, 4th Ed., CRC Press. ISBN: 08493927212.
2	Deutscher, M.P. 1990. Guide to Protein Purification. Methods in Enzymology, Vol. 182, Academic Press, San Diego, CA. Damodaran, S. Food proteins: properties and characterization. New York
3	Nielsen, S.S. 2003. Food Analysis, Third Ed., Kluwer Academic/Plenum Publishers, New York
4	Segel, I.H. 1976. Biochemical Calculations, 2nd ed. John Wiley and Sons, Inc., New York
5	Troller, J.A. and Christian, J.H.B. 1978. Water Activity and Food. Academic Press, New York.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Knowledge about the water or moisture and water activity helps to understand the basic concept of shelf life of foods. It also enables to know the different ways to control the water activity of foods and thereby increase in shelf life of foods.	16
CO-2	Study of properties of food protein, structure helps in understanding the functional role of protein in foods, it's behaviour during different stages of processing.	14
CO-3	Knowledge of structure of fatty acids, physical and chemical properties, effect of deep fat frying helps to understand the basic concepts about the role of lipid in various foods. Study of lipid also helps to understand the changes take place in foods while processing and storage	16
CO-4	Study of carbohydrates helps to understand the properties and role of carbohydrates in foods. Knowledge of starches and modified starches will help in qualitative improvement in foods.	22
CO-5	Knowledge about the pigments and their properties helps to understand their role in various foods, stability and effect of various processing methods on their retention in foods	14
CO-6	Knowledge of food additives helps in understanding the principles whereby food molecules can be selected for use as ingredients in food formulations and the related factors that can be controlled during handling, processing and storage to enhance the product quality.	18



List of Practicals / Tutorials: [Click or tap here to enter text.](#)

1	Determination of water activity and sorption isotherms of food products
2	Estimation of total sugars in foods
3	Estimation of crude fibres from food sample
4	Analysis of starch content
5	Estimation of total ash, water soluble and acid soluble ash
6	Determination of protein content of food
7	To study gel formation
8	Determination of ascorbic acid content in fruit juice
9	Extraction of essential oil/ flavouring compound of basil leave by hydrodistillation
10	Determination of total antioxidant capacity
11	Determination of degree of browning in foods
12	Determination of free fatty acids in oil

Supplementary learning Material:

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Curriculum Revision:

Version:	1
Drafted on (Month-Year):	Apr-20
Last Reviewed on (Month-Year):	Jul-20
Next Review on (Month-Year):	Apr-22