



**Subject:**

**Advanced Food Chemistry**

**Course Book Postgraduate(PhD.)**

**Lecturer's name : Dr. Nabil Hussain Rasul**

**Academic Year: 2023-2024**

Course title	Advanced Food Chemistry	
Lecturer in charge	Assist prof. Dr.Nabil H. Rasul	
Dept/ College	Halabja Technical College of Applied Sciences	Food Sciences & Quality Control
Course link in the University	Sulaimani Polytechnic University	
Coordinator's name		
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The course deals with the chemistry of the source composition and classification of Foods. their properties and interactions, and the changes that occur during processing, storage, and utilization. Emphasis will be on evidence derived from original research literature, interpretation of research findings, and problem solving based on the scientific principles of food chemistry, understanding of the chemical function and properties of major food components, the chemical interactions of food components and their effects on sensory and nutritional quality, functional properties, and safety of foods, and the chemical basis of food preservation and the effects of processing and storage on food quality. To familiarize the student with common analytical and experimental methods used in the study of the major food components, and examine the basis of food chemistry-related issues in food safety, regulation and current events.

Objectives:

1. Understand the properties of major food components .
2. Understand the chemical interactions of food components and their effects on quality foods.
3. Understand the chemical basis of food preservation ; processing and storage .
4. Familiarize the student with common analytical and experimental methods used in the study of the major food component

Course Reading List and References

Main references	Useful references	Magazines and review (Internet)
Peter C.K. Cheung 2015. Handbook of Food Chemistry . Bhavbhuti M. Mehta Editor DOI 10.1007/978-3-642-36605-5	Fennema, Owen R, 1996. Food Chemistry, 3rd Ed., Marcell Dekker, New York,	
Srinivasan Damodaran, Kirk L. Parkin 2017. Fennema's Food Chemistry., 5th Edition. CRC Press.	Wong, D.S. 1996. Mechanism and Theory in Food Chemistry. CBS Publishers and Distributors	( <a href="http://www.springerlink.com/content/x2117v/">http://www.springerlink.com/content/x2117v/</a> )
Ing. H.-D. Belitz, Professor Dr.-Ing. W. Grosch 2013. Food Chemistry. second Edition Springer Science & Business Media, Technology & Engineering.	Troller, J.A. and Christian, J.H.B. 1978. Water Activity and Food. Academic Press, New York	( <a href="http://members.ift.org/IFT/Pubs/JournalofFoodSci/jfsauthorinfo/jfsstyleguide.htm">http://members.ift.org/IFT/Pubs/JournalofFoodSci/jfsauthorinfo/jfsstyleguide.htm</a> ).
. Nielsen, S.S. 2003. Food Analysis, Third Ed., Kluwer Academic/Plenum Publishers, New York.	Coulate, T.P. 1996. Food, The Chemistry Of Its Components . R.S.C. U.K	

**Course Book****Syllabus**

No.	Title of the Subject	Lecture's name
1	Water Water Physical and Chemical Properties of Water and Ice Structure of the Water Molecule Sorption Phenomena Water activity: principles, measurement, control, effects, related concepts Methods determinations of moisture	Dr. Nabil
2	Lipids Lipid Classifications Trans Fatty Acids Hydrogenation, biohydrogenation	
3	Acylglycerols Phosphoglycerides (Phospholipids) Ether(Phospho)Glycerides (Plasmalogens) Glyceroglycolipids (Glycosylglycolipids)	
4	Fat-Soluble Vitamins Hydrolysis, Esterification, And Ester Exchange Autoxidation Photooxidation Flavor Reversion Physical Properties	
5	Methods For Measuring Lipid Oxidation Antioxidants Primary antioxidants Secondary antioxidants	
6	Proteins Physical and chemical properties of proteins Protein charge Solubility	

7	<p>Denaturation Denaturing agents Altered solubility Chemical properties of proteins Maillard reaction (carbonyl - amine browning)</p>
8	<p>Surface activity Emulsions Properties Factors of effect on stability of emulsion Emulsifying agent and HLB value Instability of emulsion and demulsification Determination of Emulsion Type</p>
9	<p>Carbohydrates conformation, anomeric forms, equilibria, reactivity, sweetness Sugar derivatives: sugar alcohols, glycosides, etc. Browning and related reactions – acrylamide and furan formation in foods</p>
10	<p>Polysaccharides - Basic structures and properties: starches, celluloses, gums, modification techniques Dietary fiber: components, properties, analysis</p>
11	<p>Fat-replacement ingredients can be categorized. Substitutes based on Esters and Ethers, Replacers based on Carbohydrates and Proteins Calorie-reduced Structured Lipids.</p>
12	<p>Smart Intervention in Solvent Extraction Ultrasound Assisted Extraction (Uae) Microwave Assisted Extraction Principles Of High- Pressure Ohmic Heating Cold Plasma Technology</p>
13	<p>Enzymes Factors affecting reaction rate; characteristics of enzymatic reactions Deleterious enzymes in food systems: phenoloxidase example Reactions catalyzed by enzyme, nonenzymatic formation of melanin Approaches to inhibition of browning. Ascorbate and sulfite chemistry, effects, and mechanisms. Chemistry, effects, and safety concerns of sulfiting agents in foods.</p>
14	<p>Vitamins Vitamins as Food Ingredients</p>

	Nature and Function Hydrolases Oxidoreductases Analysis of vitamins	
15	Flavor Description of Food Flavors Astringency Flavor and Off-Flavor Flavor of Some Foods	

### Grade Scale

Assignments and Exams	Percentage of Total Grade
Article review, Quiz, seminar, Activity and Mid-term exam.	50%
Final Exam Exams usually include different types of questions; Explain, Define, Enumerate....	50%