

DISCIPLINE SPECIFIC CORE COURSE**DSC FT 15: Food Chemistry I****CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITE OF THE COURSE**

Course title & code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Theory	Tutorial	Practical/Practice		
Food Chemistry I	4	3	0	1	XII Pass with PCM/PCB	Nil

Learning Objectives

- To understand the composition of food.
- To learn the structure, interaction, importance & stability of macro & micro components.
- To understand the functional aspects of food components and to study their role in food processing.

Learning Outcomes

After completing this course, students will be able to:

- Understand and describe the general chemical structures of the major & minor components of foods.
- Give a molecular rationalization for the observed physical properties and reactivity of the food components.
- Provide a theoretical explanation for observed extent and rates of reactions that are common to foods
- Predict how processing conditions are likely to change the reactivity of food components

THEORY

Credits: 3; Hours: 45

Unit I: Introduction to Food Chemistry

2 Hours

Unit II: Water

8 Hours

- Definition of water in food
- Structure of water and ice
- Types of water

- Sorption phenomenon
- Water activity and packaging
- Water activity and shelf-life

Unit III: Macronutrients

26 Hours

Lipids

- Classification of lipids
- Physical properties-melting point, softening point, specific gravity, refractive index, smoke, flash and fire point, turbidity point.
- Chemical properties-reichert meissl value, polenske value, iodine value, peroxide value, saponification value.
- Effect of frying on fats
- Changes in fats and oils- rancidity, lipolysis, flavor reversion
- Auto-oxidation and its prevention
- Technology of edible fats and oils- Refining, Hydrogenation and Interesterification, Fat Mimetics

Proteins

- Protein classification and structure
- Properties of proteins (electrophoresis, sedimentation, amphotericism and denaturation,)
- Functional properties of proteins eg. organoleptic, solubility, viscosity, binding gelation / texturization, emulsification, foaming.

Carbohydrates

- Classification (mono, oligo and poly saccharides)
- Structure of important polysaccharides (starch, glycogen, cellulose, pectin, hemicellulose, gums)
- Chemical reactions of carbohydrates –oxidation, reduction, with acid & alkali
- Modified celluloses and starches

Unit IV : Micronutrients

11 Hours

Vitamins

- Structure, Importance and Stability
- Water soluble vitamins
- Fat soluble vitamins

Minerals

- Major and minor minerals
- Metal uptake in canned foods
- Toxic metals

PRACTICALS

Credit: 1; Hours: 30

1. Preparation of primary and secondary standard Solutions.
2. Estimation of moisture content.
3. Determination of gelatinization temperature range (GTR) of different starches and effect of additives on GTR.
4. Determination of refractive index and specific gravity of fats and oils.
5. Determination of smoke point and percent fat absorption for different fat and oils.
6. Determination of percent free fatty acids.
7. Estimation of saponification value.
8. Estimation of total ash content.

Essential Readings

- DeMan, J.M.(2018).Principles of Food Chemistry.NewYork: AVI.
- Fennema, Owen R. (2017).Food Chemistry. 3rd Ed..NewYork: Marcell Dekker
- Whitehurst and Law.(2002).Enzymes in Food Technology. Canada: CRC Press.

Suggested Readings

- Potter, N.N. and Hotchkiss, J.H. (1999). Food Science, 5th Ed., Chapman & Hall.
- Wong, Dominic WS. (2018). Food Enzymes. New York: Chapman and Hall.
- Meyer, L.H. (2004). Food Chemistry. CBS Publishers & Distributors Pvt Ltd, India.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.