Essential Food Nutrients

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Essential Food Nutrients	2	1	0	1	XIIth Pass with Science	NIL

Learning Objectives

- To develop a basic understanding of the components of food, their source, properties and interactions as well as changes that occur during processing, storage, and utilization

Learning Outcomes

After studying this course, the student will be able to:

- Account for chemistry of foods: composition of food, role of each component
- Recognize some of the reactions and changes in individual food components which occur during processing, handling and storage

SYLLABUS

Theory:

Unit 1: Carbohydrates **3 hours**

Introduction, sources, functions, deficiencies, Structures of monosaccharides and disaccharides: glucose, fructose, galactose; lactose, maltose, sucrose, maltitol, concept of reducing and non-reducing sugars; role of carbohydrates as sweeteners in food; lactose intolerance, galactosemia, dental plaque, overview of carbohydrate metabolism.

Unit 2: Lipids **5 hours**

Introduction, sources, functions, deficiencies, classification (fatty acids, phospholipids, fats & oils, waxes), common fatty acids present in oils and fats, Omega- 3,6,9 fatty acids, trans fats, chemical properties: iodine value, saponification value, effect of frying on fats, changes in fats and oils-rancidity, lipolysis, flavor reversion, auto-oxidation and its prevention.

Unit 3: Proteins **5 hours**

Introduction, sources, functions, deficiencies, protein structure (primary, secondary and tertiary), physico-chemical & functional properties of proteins, food proteins: animal and plant proteins.

Unit 4: Vitamins & Minerals **2 hours**

Vitamins: Introduction, classification: fat-soluble vitamins & water-soluble vitamins.
Minerals: Introduction, classification: macrominerals (Ca, P, Mg) & microminerals (Se, Fe, I, Co, Zn, Cu, Se, Cr).
Role of vitamins and minerals in food chemistry.

Practicals/Hands-on Training **30 hours**

1. Determination of moisture in food products by hot air oven-drying method.
2. Colorimetric determination of iron in vitamin/dietary tablets.
3. Estimation of Vitamin C in a given solution/lemon juice/chillies by 2, 6 Dichlorophenol indophenol method.
4. Estimation of total soluble sugar content by ferricyanide method (volumetric analysis).
5. Determination of saponification value of the given fat/oil.
6. Determination of iodine value of the given fat/oil.
7. Qualitative tests for proteins and carbohydrates.
8. Qualitative Estimation of cholesterol by Liebermann Burchard method.

Essential Readings:

Theory:

- deMan, J.M., Finley, J.W., Hurst, W.J., Lee, C.Y. (2018), **Principles of Food Chemistry**, 4th Edition, Springer.
- Msagati, T.A.M. (2013), **Chemistry of Food Additives and Preservatives**, Wiley-Blackwell.
- Fennema, O.R. (2017), **Food Chemistry**, 5th Edition, CRC Press.
- Attokaran, M. (2017), **Natural Food Flavors and Colorants**, 2nd Ed., Wiley-Blackwell.
- Potter, N.N., Hotchkiss, J.H, (1995) **Food Science,** 5th Ed., Chapman & Hall.
- Brannen, D., Davidsin, P.M., Salminen, T. Thorngate III, J.H. (2002), **Food Additives**, 2nd Edition, CRC Press.
- Coultate, T. (2016), **Food: The Chemistry of its Components**, 6thEdn., Royal Society of Chemistry.
- Belitz, H. D.; Grosch, W. (2009), **Food Chemistry**, Springer.
- Course: FOOD CHEMISTRY (iasri.res.in)

Practicals:

- Ranganna, S. (2017). **Handbook of analysis and quality control for fruits and vegetable products**, 2ndEdn., McGraw Hill Education
- Sawhney, S.K., Singh, R. (2001), **Introductory Practical Biochemistry**, Narosa Publishing House

Examination scheme and mode:

Evaluation scheme and mode will be as per the guidelines notified by the University of Delhi.