**OPEN ELECTIVE-1 Chemistry in daily life**

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| Semester | I |
| Paper Code | CHOE-I |
| Paper title | Chemistry in daily life |
| Number of teaching hrs per week | 3 |
| Total number of teaching hrs per semester | 42 |
| Number of credits | 3 |

**Course outcomes**

At the end of this course, student should be able to:

1. Describe the analysis of important constituents in food items such as fat content in dairy products, caffeine in coffee/tea, methanol in alcoholic beverages, etc.
2. Give details of possible food additives, preservatives, colorants and adulterants commonly used in processed food.
3. Explain the nutritional aspects of macro and micronutrients, namely oils/fats and vitamins respectively.
4. Explain the chemistry of daily used products like soaps/detergents, batteries/fuel cells and polymers.

**Course Objective**

The objective of this paper is to equip the non-chemistry students with knowledge about chemistry of some of the products which are commonly used in daily life.

**Course specific outcome**

After studying this paper, the student would be able to:

1. Describe the composition of the milk and dairy products.

2. Detect/determine the amount of caffeine, chicory in coffee and chloral hydrate in toddy.

3. Explain the preservatives used in food products and their effects and possible adulterants.

4. Acquire detailed information about the colorants used in food products.

5. Differentiate various vitamins, their sources and deficiencies.

6. Examine purity of the oils.

7. Explain how electrical energy is stored in batteries.

8. Classify commonly used polymers in our daily lives.

**Content of open elective-1**

**Dairy Products** **(6 h)**

Composition of milk and milk products. Analysis of fat content, minerals in milk and butter. Estimation of added water in milk. Beverages: Analysis of caffeine in coffee and tea, detection of chicory in coffee, chloral hydrate in toddy, determination of methyl alcohol in alcoholic beverages.

**Food additives, adulterants, and contaminants**  **(6 h)**

Food preservatives like benzoates, propionates, sorbates, and disulphites. Artificial sweeteners: aspartame, saccharin, dulcin, sucralose, and sodium cyclamate. Flavors: vanillin, alkyl esters (fruit flavors), and monosodium glutamate**.**

**Artificial food colorants (2 h)**

Coal tar dyes and non-permitted colors and metallic salts. Analysis of pesticide residues in food.

**Vitamins (6 h)**

Classification and nomenclature. Sources, deficiency diseases, and structures of vitamin A1, vitamin B1, vitamin C, vitamin D, vitamin E & vitamin K1.

**Oils and fats** **(5 h)**

Composition of edible oils, detection of purity, rancidity of fats and oil. Tests for adulterants like argemone oil and mineral oils. Halphen test.

**Soaps & Detergents** **(3 h)**

Definition, classification, manufacturing of soaps and detergents, composition and uses.

**Chemical and renewable energy sources** **(6 h)**

Principles and applications of primary & secondary batteries and fuel cells. Basics of solar energy, future energy storer.

**Polymers (8 h)**

Basic concept of polymers, classification and characteristics of polymers. Applications of polymers as plastics in electronic, automobile components, medical field, and aerospace materials. Problems of plastic waste management. Strategies for the development of environment-friendly polymers.

**Recommended Books/References:**

1. B. K. Sharma: Introduction to Industrial Chemistry, Goel Publishing, Meerut (1998).
2. The chemical analysis of foods. Pearson, David, 1919-1977. Cox and Pearson. 7th ed. Published Edinburgh; New York: Churchill Livingstone, 1976.
3. Foods: Facts and Principles. N. Shakuntala Many and S. Swamy, 4thed. New Age International (2020).
4. Odian; George, Principles of Polymerization, 4ty edition McGraw-Hill Book Co., New York (2007).
5. W. Billmeyer, Text book of polymer science, 3rd Edn., 2007, Wiley.
6. Subalakshmi, G and Udipi, SA Food processing and preservation, 1st Ed. New Age International (P)Ltd, (2006).
7. Srilakshmi B: Food Science, 7th Colour Ed. New Age International (P) Ltd, (2018).
8. Potter N N and Hotchkiss JH ,Food science,5th Ed , Spinger, 2007.

10. M.P. Stevens, Polymer Chemistry: An Introduction 3rd ed. Oxford University Press (2005).

**Pedagogy:** ICT tools, Chalk & Talk, Models & Charts.

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| **Formative Assessment (Internal assessment) Theory** |
| **Assessment Occasion/ type** | **Weightage in Marks** |
| Continuous evaluation and class test | 20 |
| Seminars/Class work | 10 |
| Assignments/Discussions | 10 |
| **Total** | 40 |
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