



CHEMISTRY  
(Interdisciplinary)  
(1<sup>st</sup> Semester)

Course No.: **CHM-IDC-101**

**(Fundamentals of Chemistry -I)**

*Application of Chemistry in Everyday life*

**Contact Hours: 45; Credits: 03**

**Full Marks = 100**[End Semester Exam (70) Internal Assessment (30)]

**Pass Marks = 40** [End Semester Exam (28) Internal Assessment (12)]

**Unit 1: Vitamins, minerals and enzyme**

Classification and nomenclature of vitamins. Need for vitamin in body, Types of vitamins, water soluble and fat-soluble vitamins, Sources, deficiency diseases and structures of vitamin A1, vitamin B12, Vitamin C (Cyanocobalamin), vitamin D vitamin E and vitamin K. Role of minerals in body, iodine deficiency and remedy.

Classification and nomenclature, prosthetic groups, cofactors of enzyme, properties of enzymes as catalysts, specific activity, turn over number and catalytic center activity. Isolation of enzymes from different sources.

**Unit 2: Respiration and energy production in human body**

Respiration, Respiratory enzymes, brief outline of hemoglobin and myoglobin, oxygen transport mechanism in body, co-operativity, Respiration in lower animals, hemocyanine, hemerythrin. Energy production in body, ATP, enzyme responsible for food digestion, mechanism of food digestion, active site of cytochrome c-oxidase.

**Unit 3: Food and food preservation**

Basics of human physiological system and food science: digestive system: structure and functions of G.I. tract. Process of digestion and absorption of food, structure and function of liver, gall bladder and pancreas. Basic concept on food, nutrition and nutrients (nutrition, malnutrition and health scope of nutrition). Classification of food, classification of nutrients.

Definition, objectives and principles of food preservation. Different methods of food preservation. Preserved products: jam, jelly, Marmalade, sauces, pickles, Squashes, syrup types, composition and manufacture, selection, cost, storage, uses and nutritional aspects. Food Standards: ISI, Agmark, FPO, MPO, PFA, FSSAI.

**Unit 4: Food additives, adulterants and contaminants**

Definition, objectives and principles of food additives, adulterants and contaminants. Different types of food additives (benzoates, propionates, sorbates, disulphites), artificial sweeteners (aspartame, saccharin, dulcin, sucralose and sodium cyclamate), flavours [vanillin, alkyl esters (fruit flavours) and monosodium glutamate].

Artificial food colorants: coal tar dyes and non-permitted colors and metallic salts. Analysis of pesticide residues in food.

**Unit 5: Chemistry of Materials:**

Soaps and Detergents – their action, Biofuels – production of biofuels and its utility as alternative fuel source, Fibers: natural fibers, cotton, wool, silk, rayon, artificial fibers, polyamides, acrylic acid, PVC, Examples of natural biodegradable polymers, cellulose,



cellulose acetate, cellophane, synthetic biodegradable polymers. Use of polymeric materials in daily life.

### Reference Books:

1. Srilakshmi B (2017): Nutrition Science, 6th Multicolour Ed. New Age International (P) Ltd.
2. Roday S (2012): Food Science and Nutrition, 2nd Ed. Oxford University Press.
3. Mann J and Truswell S (2017): Essentials of Human Nutrition, 5th Ed. Oxford University Press.
4. Ashtoush Kar: Medicinal Chemistry, New Age International Publishers, 7<sup>th</sup> edition (2018).
5. Sadasivan S and Manikam K (2007): Biochemical Methods, 3rd Ed. New Age International (P) Ltd.
6. N. Shakuntala Many and S. Swamy: Foods-, Facts and Principles, New Age International Publishers, 4<sup>th</sup> edition (1998).
7. B. Srrilakshmi: Nutrition Science, New Age International Publishers, 6<sup>th</sup> edition (2016).
8. Subalakshmi, G and Udipi, SA (2006): Food processing and preservation, 1st Ed. New Age International (P)Ltd.
9. S. N. Mahindru,: Food Additives: Characteristics, Detection and Estimation, Aph Publishing Corporation, New Delhi (2008)
10. Bertini, I., Gray, H. B., Lippard, S. J. and Valentine, J. S. (1994) Bioinorganic Chemistry. University Science Books (1994)

#####