UNIVERSITY OF KERALA

Open Course in CHEMISTRY

for the 5th semester students of CBCSS First Degree Programmes in subjects other than BSc Chemistry

SYLLABUS

Semester: **5** | Type of course: **Open Course**
Course Code: **CH1551.1** | Course Name: **ESSENTIALS OF CHEMISTRY**
Instruction Hours/Week: **3** | Number of credits: **2**

MODULE I - **Atomic structure and Periodic Classification of Elements (9hrs)**

Structure of atom- Fundamental particles, atomic mass, atomic number, isotopes. Bohr theory of atom. Orbitals- Quantum numbers, Aufbau principle, Hund's rule; Pauli's exclusion principle. Electronic configuration of atoms- half and completely filled orbitals. Modern periodic table: Periods, Groups, Periodicity- valency, atomic radius, electronegativity, Ionisation potential, Electron affinity.

MODULE II - **Nuclear Chemistry (9hrs)**

Natural radioactivity, Nature and types of radiations, Properties. Group displacement law. Radioactive decay series. Decay rate. Half life period, Average life period, Unit of radioactivity. Radiation dose, artificial radioactivity, nuclear structure. Nuclear fission and Nuclear fusion. Rock dating- Radio carbon dating. (elementary idea only)

MODULE III - **Polymer Chemistry (9hrs)**

Classification of polymer: Origin, structure, synthesis, Molecular forces. Commercially important polymers: Application of polyethylene, polystyrene, polyhaloolefines, Nylon-6, Nylon-6, 6, Melamine, Terylene, Bakelite, Natural and synthetic rubber, vulcanization, inorganic polymer :(Examples Only)

MODULE IV - **Chemistry in Biological Process (9hrs)**

Vitamins: Vitamin-A, Vitamin-B2, Vitamin-C, Vitamin-D, Vitamin-E and Vitamin-K- Name, Source, Function and deficiency diseases. Enzymes- Classifications, characteristics, role, examples. Hormones- Sex hormones- Androgens, oestrogens, progesterone, Example, function. Cortical hormones-A few examples with function. Nucleic acid- RNA, DNA: Introduction- role in life process (No structure or chemical reactions needed)

MODULE V - **Chemistry in action (9hrs)**

Dyes: classification based on constitution, application, examples, uses. Drugs: Antipyretic, analgesic, antiseptic, disinfectants, tranquillizers, antibiotics structure, name and uses only. Soaps and detergents: Hard and soft soaps, anionic, cationic and non-ionic detergents, cleansing action of soaps, Explosives: TNT, TNG, RDX, Gun cotton: name, structure and action. (No structure or chemical reactions needed)

MODULE VI - **Environmental Chemistry (9hrs)**

Air Pollution: Types of pollutant in air- carbon monoxide, carbon dioxide, Nitrogen oxides, Sulphur dioxides, hydrogen sulphide, Cl_2, CFC, particulate matter, metals, fly ash, asbestos, hydrocarbons- source and influence. Acid rain, Green house effect, ozone layer and its depletion. Water Pollution: Various factors affecting purity of water, sewage water, industrial waste, agricultural pollution such as pesticides, fertilizers, detergents. Hard and soft water, Removal of hardness, disadvantage of hard water. Soil pollution: Due to pesticides, herbicide, fungicide, long term use of fertilizers, plastic waste.

REFERENCES:

1. M. C. Day and J. Selbin, “Theoretical Inorganic Chemistry”.
2. H. S. Arniker,“ Essentials of Nuclear Chemistry:
3. B. K. Sharma “Environmental Pollution”.
4. Solomons- John- Wiley, “Fundamentals of Organic Chemistry”.
5. F. A. Carey, Mc. Graw Hill, “Organic Chemistry” Inc. 226
6. I. L. Finar,“Organic Chemistry”, Vol. 1 Longman
7. Tewari, Mehrotra- Vikas & Vishnoi,“A Text book for Organic Chemistry:
8. M. K. JainJain, “Principles of Organic Chemistry”
9. A. K. Dey,“Environmental Chemistry”