I Year II Semester	L	T	P	C
Code: 20CH2002	3	0	0	3

APPLIED CHEMISTRY

Course Outcomes:

1. Explain the preparation, properties, and applications of some plastic materials.
2. Categorize the reasons for corrosion and study some methods of corrosion control
3. Understand the importance of materials like nanomaterials and fullerenes and their uses.
4. Understand the importance of semiconductors and molecular machines
5. Understand the principles of different analytical instruments.

UNIT I:

Polymerization: Introduction-methods of polymerization

Plastics: Compounding-fabrication (compression, injection) - preparation, properties and applications of Polyethylene, Bakelite

Elastomers: Natural rubber – drawbacks – vulcanization - preparation, properties and applications of synthetic rubbers (Buna S, Buna N).

Composite materials: Conducting polymers (Poly acetylene)-biodegradable polymers (Poly vinyl alcohol and Poly lactic acid)

UNIT II:

Single electrode potential - galvanic cell - Electrochemical series and uses of series - standard hydrogen electrode, calomel electrode

Batteries: Dry cell, Ni-Cd cells (sintered type) and Fuel cells: H_2-O_2, CH_3OH-O_2.

Corrosion: Definition-theories of corrosion (chemical and electrochemical)-galvanic corrosion, galvanic series, waterline corrosion- stress corrosion-factors influencing rate of corrosion-corrosion control (cathodic protection)- Protective coatings: cathodic and anodic coatings (galvanizing and tinning)

UNIT III:

Nano materials:-Introduction-chemical reduction method- Types, preparation and applications of - carbon nanotubes and fullerenes

Liquid crystals:-Introduction-types-applications.

Insulators: Thermal and Electrical insulators (definition, characteristics).

Super conductors:-Type –I, Type II-characteristics and applications

UNIT IV:

Green chemistry: Introduction, 8 Principles and Green synthesis of Acetanilide and Adipic acid.

Semiconducting materials: Classification, Band theory of solids, Doping of Silicon- p and n type semiconductors, preparation of semiconductors (Zone refining, Czochralski crystal pulling) - Semiconductor devices (p-n junction diode as rectifier).

UNIT V:

Spectroscopic Techniques: Electronic Spectroscopy - Beer-Lambert's law and its derivation, Applications of Beer-Lambert's law, instrumentation of UV-visible spectrophotometer.

IR Spectroscopy - Types of vibrations, Instrumentation of IR spectrophotometer and the applications.

Non-Conventional Energy Source: Design, working, schematic diagram, advantages and disadvantages of photovoltaic cell, hydropower, ocean thermal energy conversion, tidal energy.

Text Books:

1. Engineering Chemistry by Dr. Bharati Kumari, VGS Publications.

Prescribed Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publications Co. Latest edition
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2019 edition.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Engineering Chemistry by Shashi Chawla; Dhanpat Rai Publications Co. Latest edition