CY110	CHEMISTRY	3-0-2

COURSE OBJECTIVE:

The objective of this foundational course is to develop general familiarity and understanding with the following areas in chemistry: inorganic, organic, physical chemistry, electrochemistry, photochemistry and Thermochemistry. The course also intended to make students work effectively and safely in the laboratory working environment. Last portion of curriculum addresses critical thinking and numerically analyzing the chemical problems.

COURSE CONTENT:

Molecular Structure & Bonding: VSEPR Model, Valance-Bond Theory, Molecular Orbital Theory, Molecular Orbital of Polyatomic Molecules.

Electrochemistry: Arrhenius theory of electrolytic dissociation, Transport Number, Kohlrausch's Law, Solubility Product, Redox Reaction, Electrochemical & Concentration Cells.

Chemical & Phase Equilibria: Phase Diagram for single component system (Water), Phase diagram for Binary Eutectic System (Copper-Silver), Corrosion of metals in acids, Corrosion by Oxygen, Corrosion by Metal Contact.

Reaction Dynamics: Order, Molecularity, Rate Law, Methods of determining order of reaction (Ist & 2nd Order).

Polymers & Polymerization: Monomers, Polymers, their classification, thermoplastics & thermosetting with examples, Bio-Polymerization, Bio-Degradable Polymerization, Preparation, Properties & Technical Applications of PVC, PVA, Teflon, Nylon6, & Nylon6:6, Polyester, Phenol-Formaldehyde, Urea- Formaldehyde, Natural & Synthetic Rubber, Vulcanization of Rubber.

Photochemistry: Photo-excitation of organic molecules, Jablonski Diagram, Laws of Photochemistry and quantum yield, some examples of photochemical reactions, chemistry of vision and other applications of photochemistry.

Thermochemistry: Fundamental concept of first law, work, heat, energy and enthalpies, relation between Cv & Cp. Second Law: Entropy, Free Energy, (The Helmholtz and Gibbs) and chemical potential.

Numerical problems based on water analysis and water softening process. Determination of hardness by complexometry, Alkalinity and its determination and their relevant numerical problems, testing of lubricating oils, viscosity and viscosity index, flash & fire point, cloud & pour point, Aniline Point, Carbon Residue, Steam-emulsion number, Neutralization number, Saponification number.

LABORATORY

Experiments as suggested by the course coordinator.

COURSE OUTCOMES

Student after successful completion of course must possess skills to think critically and analyze chemical problems. They must also feel confident to work in teams as well as independently. Students are also expected to learn solving chemistry problems with an engineering purview. Laboratory work is intended for students to learn conducting experiments, and analyze experimental data.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment. Laboratory assessment will be based on assignments, presentations, and interview of each candidate.

REFERENCES

Lee, J. D, Author, Concise Inorganic Chemistry*, Oxford University Press*

Alberty, R. A., Physical Chemistry, John Wiley and Sons

N. Krishnamurthy, P. Vallinayagam, Engineering Chemistry, PHI Learning Pvt. Ltd.

Kuriacose J.C. and Rajaram J., Chemistry in Engineering and Technology, Tata McGraw Hill.