

Subject Code: 2SC1030301

Subject Title: Chemistry - 301

Course Objective:

Generally, knowledge with the following areas in chemistry: analytical, inorganic, organic, physical and biochemistry. The faculty to job effectively and securely in a laboratory environment. Opportunities for student and faculty to interact with alumni and with professional chemists. The fundamental analytical and industrial skills to work and industrial skills to work effectively in the different fields of chemistry. The capacity to produce, divide and characterize compounds using published reactions, protocols, normal laboratory equipment, and current instrumentation.

Teaching scheme (hours) per week		Credit		Theory Marks		Practical Marks		Total
Theory	Practical	Theory	Practical	University Assessment	Cont. Assessment	University Assessment	Cont. Assessment	
3	-	3	-	70	30	-	-	100

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Acid-Base Properties : Brönsted-Lowry concept of acid-base reactions, solvated proton, relative strength of acids, Factors effecting on acidity and basicity of compounds, Resonance effect (Drawing resonance structures and the conditions for resonance), Inductive and electronic effects, Effect of hybridization, Steric effects, Effects by hydrogen bonding, types of acid-base reactions, levelling solvents, Lewis acid-base, concept, Classification of Lewis acids, Hard and Soft Acids and Bases (HSAB) Application of HSAB principle.	18	25
2	Thermodynamics: Phase in Equilibrium. Phases, components and degrees of freedom of a system, criteria of phase equilibrium. Gibbs, Phase Rule and its thermodynamic derivation. Derivation of Clausius–Clapeyron equation, and its importance in phase equilibria. Phase diagrams of one-component systems (water and sulphur) and two component systems involving eutectics, congruent and incongruent melting points (lead-silver, FeCl ₃ -H ₂ O and Na-K only).	12	25
3	Wave Mechanics: Black Body Radiation & Quantum Theory, Photo electric effect: Wave particle duality of radiation, Compton effect, Basic postulates of quantum Mechanics, Operator: Definition, Algebra of operators, Addition, Multiplication, Commutative properties, Linear operator, Commutator operators, Laplacian operator. Free particle system. Particle in one dimension box.	20	25
4	Partial molar Properties. Partial molar free energy, Concept of Chemical Potential, Gibbs-Duhem equation, Variation of chemical potential with temperature and pressure, Duhem-Margules equation, Numerical.	10	25

Course Outcome:

- ❖ Have solid foundations in the fundamentals and purpose of current chemical and scientific theories.
- ❖ Are capable to design, carry out, record and analyze the results of chemical experiments.
- ❖ Are capable to use current instrumentation and classical techniques, to design experiments, and to properly record the results of their experiment.
- ❖ Are skillful in problems solving, significant thinking and analytical reasoning.
- ❖ Are capable to identify and solve chemical problems and explore new areas of research.
- ❖ Are capable to use up to date library searching and retrieval methods to obtain information about a topic, chemical, chemical technique, or an issue relating to chemistry.

List of References:

Inorganic Chemistry

1. Quantum Chemistry by R. K.Prasad, Revised IIIrd Edition, Page-3,5,7,34-37,41,65-68.
2. Concise Inorganic Chemistry J.D.Lee, 4th edition, ELBS publication.

Organic Chemistry

1. Organic Chemistry by Morrison and Boyd.4th ed. Pearson Education-2003
2. Organic Chemistry by pine, Hendrickson, Cram and Hammond 4th ed. By P.S.Kalsi.
3. Advance Organic Chemistry by Jerry March.
4. Advance Organic Chemistry by Arun Bahal and B.S.Bahal.
5. Organic Chemistry Vol. I & II by S.M.Mukherji, S.P.Sing, R.P.Kapoor.
6. Reaction mechanism and Reagents in Organic Chemistry by Gurdeep R.Chatwal 4th ed. Himalaya public House.
7. Text book of Organic Chemistry by Arun Bahal, B.S.Bhal,S.Chand.
8. Organic Spectroscopy by P.S.Kalsi.
9. Organic Chemistry by I.R.Finar.

Physical Chemistry

1. Advance Physical Chemistry by Gurdeep Raj
2. Physical Chemistry (Question and Answers) by R.N.Madan, G.D.Tully,S.Chand.
3. Principal of Physical Chemistry by Puri, Sharma,Pathania.
4. Chemical Thermodynamics by R.P.Rastogy andR.R.Misra.
5. Essentials of Physical Chemistry by B.S.Bahal, Arun Bahal,G.D.Tully.
6. Physical Chemistry by P.W.Atkins, 5th ed. , Oxford, 1994, 7th ed.,2002
7. Physical Chemistry by R.A.Alberty and R.J.Silbey, John Wiley,1995.
8. Physical Chemistry by G.H.Barrow, 5th ed. , Mac Graw Hill, 1998, 6thed.
9. Physical Chemistry by W.J.Moore, 4th ed. , Orient Longmans,1969.

Analytical Chemistry

1. Fundamentals of Analytical Chemistry by Skoog &West.

2. Analytical Chemistry, Garry D.Christain.
3. Analytical Chemistry, Day & Underwood.
4. Analytical Chemistry by Lerry & Hergins.
5. Qualitative Analysis by A.I.Vogel, 5thed.

e-Resource:

1. www.google.com
2. <http://onlinelibrary.wiley.com/>
3. https://en.wikipedia.org/wiki/Main_Page