



**C. U. SHAH UNIVERSITY**



**C. U. SHAH UNIVERSITY  
WADHWAN CITY  
FACULTY OF SCIENCE**

**B.Sc.**

**SEM- VI**

**Syllabi (CBCS) of  
Chemistry**



# **C. U. SHAH UNIVERSITY**

## **FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY**

**COURSE: B.Sc.**

**SEMESTER: VI**

**SUBJECT NAME: Inorganic Chemistry-II**

**SUBJECT CODE: 4SC06CHC1**

### **Teaching & Evaluation Scheme:-**

Teaching hours/week				Credit	Evaluation Scheme/semester							
Th	Tu	Pr	Total		Theory				Practical			Total Marks
					Sessional Exam		University Exam		Internal		University	
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

### **Objectives:-**

- To determine term symbol and calculate the microstates.
- To understand the structure of metal carbonyl complexes.
- To learn chemical bonding in metal complexes.
- To gain an appreciation for how inorganic chemistry influences your everyday life.

### **Prerequisites:-**

Before studying Inorganic chemistry, all students have basic knowledge of inorganic and organic compounds, molecular structure, Molecular orbital theories and knowledge related to UG level chemistry.

### **Course outline:-**

Sr. No.	Course Contents
1	<b>Term symbol:</b> Russel Saunders coupling and determination of Term symbol of the ground state, Calculation of number of microstates, Pigeon hole diagram of $p^2$ and $d^2$ configurations, Hund's rule, Hole formulation. <b>Electronic spectra of metal complexes</b> Electronic spectra of transition metal complexes, Laporte orbital and spin selection rules, Orgel energy level diagram of $d^5$ and combined diagrams of $d^1-d^9$ , $d^2-d^8$ , $d^3-d^7$ , $d^4-d^6$ and their spectra, Jahn Teller distortion, Spectrochemical series.
2	<b>Quantum chemistry :</b> Setting up of operators for different observables, Hermitian operator, important theorems concerning Hermitian operator, Particle in a three dimensional box, The rigid Rotator, The Schrodinger equation in spherical polar coordinates for hydrogen atom, separation of variables, solution of R, $\theta$ and $\phi$ equations.



<b>3</b>	<b>Metal carbonyls :</b> Mono and poly-nuclear metal carbonyls: $\text{Ni}(\text{CO})_4$ , $\text{Fe}(\text{CO})_5$ , $\text{Cr}(\text{CO})_6$ , $\text{Fe}_2(\text{CO})_9$ , $\text{Fe}_3(\text{CO})_{12}$ , $\text{Co}_2(\text{CO})_8$ , $\text{Mn}_2(\text{CO})_{10}$ , $\text{Ir}_4(\text{CO})_{12}$ , $\text{Co}_4(\text{CO})_{12}$ . Metal nitrosyl and metal carbonyl hydrides. <b>Co-ordination chemistry</b> Reaction, kinetics and mechanism. Trans effect and trans influence, Theories of trans effect: Polarization theory.
<b>4</b>	<b>Chemical bonding :</b> $\pi$ -bonding theory, MO theory, Mo treatment of $[\text{FeF}_6]^{-4}$ , $[\text{Fe}(\text{CN})_6]^{-4}$ , $[\text{IrF}_6]^{-4}$ & $[\text{PtCl}_4]^{-2}$ . <b>Boron hydrides:</b> Types of bonds found in higher boranes. Structure of $\text{B}_4\text{H}_{10}$ , $\text{B}_5\text{H}_9$ and $\text{B}_5\text{H}_{11}$ .

### **Learning Outcomes:-**

After the successful completion of the course, students will be able to

- Learn basic concepts of quantum chemistry and its applications.
- Understanding of the calculation and determination of microstates and term symbol respectively.
- They can get idea of chemical bonding in metal complexes.
- Aware about general properties and uses of organic and inorganic reagents in inorganic chemistry.

### **Books Recommended:-**

1. Principles of Inorganic Chemistry: Puri, Sharma and Kalia.
2. Concise Inorganic Chemistry: J.D.Lee; Wiley India.
3. 'Shriver and Atkins' Inorganic Chemistry: Atkins, Overton, Rourke, Weller, Armstrong; Oxford University Press.
4. Advanced Inorganic Chemistry: F.A. Cotton and Wilkinson G.; John Wiley.
5. Introductory Quantum Chemistry: A.K. Chandra; Tata-McGraw Hill.
6. Advanced Inorganic chemistry: (Vol. 1) Satya Prakash, Tuli, Basu and Madan; S. Chand
7. Advanced Inorganic chemistry: Gurdeep Raj; Goel Publishing House.

### **E-Resources:-**

1. [en.wikipedia.org/wiki/Term\\_symbol](http://en.wikipedia.org/wiki/Term_symbol)
2. [en.wikipedia.org/wiki/Quantum\\_chemistry](http://en.wikipedia.org/wiki/Quantum_chemistry)
3. [en.wikipedia.org/wiki/Chemical\\_bond](http://en.wikipedia.org/wiki/Chemical_bond)



# **C. U. SHAH UNIVERSITY**

## **FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY**

**COURSE: B.Sc.**

**SEMESTER: VI**

**SUBJECT NAME: Organic Chemistry-II**

**SUBJECT CODE: 4SC06CHC2**

**Teaching & Evaluation Scheme:-**

Teaching hours/week				Credit	Evaluation Scheme/semester							
Th	Tu	Pr	Total		Theory				Practical			Total Marks
					Sessional Exam		University Exam		Internal		University	
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

### **Objectives:-**

- To boost up the basic concept of alkane.
- Introduction of aromatic nucleophilic substitution, carbonyls and aromaticity.

### **Prerequisites:-**

Basic theories and principles of organic chemistry at the UG level.

### **Course outline:-**

Sr. No.	Course Contents
1	<b>Methane: Energy of Activation. Transition State</b> <ul style="list-style-type: none"><li>• Hydrocarbons, Structure of methane, Physical properties, Source, Reactions</li><li>• Oxidation, Heat of combustion, Chlorination: a substitution reaction</li><li>• Control of chlorination, Reaction with other halogens: halogenations, Relative reactivity</li><li>• Reaction mechanisms, Mechanism of chlorination, Free radicals, Chain reactions</li><li>• Inhibitors, Heat of reaction, Energy of activation, Progress of reaction: energy changes</li><li>• Rate of reaction, Relative reactivities of halogens toward methane.</li></ul>
2	<b>Aryl halides; nucleophilic aromatic substitution</b> Structure, Physical properties, Preparation, Reactions, Low reactivity of aryl and vinyl halides, Structure of aryl and vinyl halides, Nucleophilic aromatic, substitution: bimolecular displacement, Bimolecular displacement mechanism for nucleophilic aromatic substitution, Reactivity in nucleophilic aromatic substitution, Orientation in nucleophilic aromatic substitution, Electron withdrawal by resonance, Evidence for the two steps in bimolecular, displacement, Nucleophilic substitution: aliphatic and aromatic, Elimination-addition mechanism for nucleophilic aromatic substitution. Benzyne, Analysis of aryl halides



3	<b>Aldehydes and Ketones:</b> Structure, Nomenclature, Physical properties, Preparation of ketones by Friedel-Crafts acylation, Preparation of ketones by use of organocopper compounds, Addition of cyanide, Addition of derivatives of ammonia, Addition of alcohols, Acetyl formation, Cannizzaro reaction, Grignard synthesis, Base-promoted halogenation of ketones, Acid-catalyzed halogenation of ketones, Aldol condensation, The Wittig reaction, Claisen condensation.
4	<b>Aromaticity Benzene</b> Aliphatic and aromatic compounds, Structure of benzene, Molecular formula, Isomer number, Kekule structure, Stability of the benzene ring, Reactions of benzene, Resonance structure of benzene, Orbital picture of benzene, Representation of the benzene ring, Aromatic character, The Huckel $4n+2$ rule, Nomenclature of benzene derivatives, Polynuclear aromatic hydrocarbons, Naphthalene, Quantitative elemental analysis: nitrogen and sulfur.

**Learning outcomes:**

The students can have the brief introduction of activation energy of the methane and its transitions, nucleophilic aromatic substitution of the aryl halides, the carbanions and carbocations of carbonyl compounds along with the aromaticity of the benzene.

**Books recommended:**

1. Organic Chemistry by Morrison and Boyd
2. Text book of organic chemistry by Soni P L and Chawla H M
3. Advanced Organic Chemistry: Reaction Mechanisms and Structure by Jerry March
4. Organic Chemistry by Clayden Jonathan
5. Organic chemistry: Vol-II : stereochemistry and the chemistry of natural products by I L Finar
6. Instant Notes: Organic Chemistry by Patrick Graham L E-resources:

**E-Resources:**

1. <https://archive.org/details/organicchemistry031426mbp>
2. <http://sultanchandandsons.com/viewdetails.aspx?ID=199>
3. <http://www.organic-chemistry.org/>
4. <http://www.chemguide.co.uk/orgmenu.html>
5. <http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm>
6. [http://chemwiki.ucdavis.edu/Organic\\_Chemistry](http://chemwiki.ucdavis.edu/Organic_Chemistry)



# **C. U. SHAH UNIVERSITY**

## **FACULTY OF SCIENCE** **DEPARTMENT OF CHEMISTRY**

**COURSE: B.Sc.**

**SEMESTER: VI**

**SUBJECT NAME: Physical Chemistry-II**

**SUBJECT CODE: 4SC06CHC3**

**Teaching & Evaluation Scheme:-**

Teaching hours/week				Credit	Evaluation Scheme/semester							
Th	Tu	Pr	Total		Theory				Practical			Total Marks
					Sessional Exam		University Exam		Internal		University	
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

### **Objectives:-**

- To understand concept and theories of physical chemistry.
- To get idea about thermodynamics, Chemical Equilibria and chemical kinetics.
- To understand applications of physical chemistry and colligative properties in daily life.
- To generate interest and curiosity about physical chemistry.

### **Prerequisites:-**

Before learning Physical chemistry, student should aware about basic principles and theories of physical chemistry, thermodynamics and solution, Kinetics, chemical Equilibria and other UG level chemistry.

### **Course outline:-**

Sr. No.	Course Contents
1	<p><b>Third law of thermodynamics</b> Nernst heat theorem, Third law of thermodynamics, Determination of absolute entropies of solid, liquid and gasses, Application of third law of thermodynamics, Test of third law of thermodynamics, The Boltzmann entropy equation and Residual entropy.</p> <p><b>Chemical Equilibria</b> Reversible reaction, Law of Mass action, Equilibrium Constant, Equilibrium Law, Vant-Hoffs equation, relation between <math>K_p</math>, <math>K_c</math>, <math>K_x</math>, Le-Chateliers Principle, Condition for maximum yield in industrial process, Synthesis of ammonia habers process.</p>



<b>2</b>	<b>Chemical Kinetics</b> Chemical Kinetics, Reaction Rates, Rate law, Order of reaction, zero order reaction, Pseudo-order reaction, First order reaction, second order reaction, Third order reaction and their characteristics, Graphical methods for determining the order of the reaction, Collision theory of reaction rates, transition state theory, Effect of Temperature on rate of reaction.
<b>3</b>	<b>Nuclear Chemistry</b> Radioactivity, isotopes, isobars and isotones, Types of radiation, properties of radiation, detection and measurement of radioactivity, Types of radioactive decay, The group displacement law, radioactive degeneration series, rate of radioactive decay, half-life period, Radioactive dating, Nuclear transformation, nuclear equations, Artificial Radioactivity, Nuclear isomerism, Mass defect, Nuclear binding energy, Hazards of Radiation, applications of radio isotopes.
<b>4</b>	<b>Colligative Properties</b> Lowering of vapor pressure, Measurement of lowering of vapor pressure, Osmosis and osmotic pressure, measurement of osmotic pressure, theories of semi permeability, Effect of osmosis and semi permeability, Reverse Osmosis, Boiling point elevation, freezing point depression, colligative properties of electrolytes.

### **Learning Outcomes:-**

After the successful completion of the course, students will be able to

- Understand Thermodynamics and its applications.
- Understand about dilute solutions, its properties and various colligative properties.
- Concept of Nuclear Chemistry and various applications
- Understand Chemical Kinetics and various rate or reactions.

### **Books Recommended:**

1. 'Essentials of Physical Chemistry, B.S. Bahl, Arun Bahl and G.D. Tuli, *S. Chand & Company*.
2. 'Textbook of Physical chemistry' P. L. Soni, O. P. Dharmaraha, U. N. Dash, Sultan
3. 'Principles of Physical chemistry' Puri, Sharama & Pathani, Vishal Publications
4. 'Thermodynamics for chemist' S. Glastone, East west Publications
5. 'Physical Chemistry' B. K. Sharma, Goel Publishing House
6. 'A Textbook of Physical Chemistry', K. L. Kapoor, *Macmillan*.
7. 'Elements of Physical Chemistry', Atkins Petter, Oxford Press.

### **E-resources:**

1. <http://www.allaboutscience.org/third-law-of-thermodynamics-faq.htm>
2. <http://www.chm.davidson.edu/vce/equilibria/BasicConcepts.html>
3. <http://www.science.uwaterloo.ca/~cchieh/cact/c123/massacti.html>
4. <http://chemed.chem.purdue.edu/genchem/topicreview/bp/ch22/rate.php>
5. [http://chemwiki.ucdavis.edu/Physical\\_Chemistry/Nuclear\\_Chemistry](http://chemwiki.ucdavis.edu/Physical_Chemistry/Nuclear_Chemistry)
6. <http://chemed.chem.purdue.edu/genchem/topicreview/bp/ch15/colligative.php>





## **C. U. SHAH UNIVERSITY**

### **FACULTY OF SCIENCE** **DEPARTMENT OF CHEMISTRY**

**COURSE: B.Sc.**

**SEMESTER: VI**

**SUBJECT NAME: Analytical Chemistry-II**

**SUBJECT CODE: 4SC06CHC4**

**Teaching & Evaluation Scheme:-**

Teaching hours/week				Credit	Evaluation Scheme/semester							
Th	Tu	Pr	Total		Theory				Practical			Total Marks
					Sessional Exam		University Exam		Internal		University	
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

**Objectives:-**

- To understand concept and theories of analytical chemistry.
- To get idea about instrumentation techniques.
- To understand applications of NMR and Mass spectroscopic techniques.
- To generate interest and curiosity about analytical chemistry.

**Prerequisites :-**

Before learning analytical chemistry, student should aware about basic principles and theories of analytical chemistry, various instrumental methods, spectroscopic techniques and other UG level chemistry.

**Course outline:-**

Sr. No.	Course Contents
1	<b>Gas Chromatography</b> Introduction, Principles of GLC and GSC <b>GLC:</b> Instrumentation, Evaluation selection and characteristic of carrier gas, effect of temperature & pressure of gas, its application <b>GSC:</b> Methods and its application





<b>2</b>	<b>pH metry and Potentiometry:</b> <b>pH metry:</b> Introduction and interpretation of pH, Definition, Interpretation of various methods of determining pH values like pH paper method, potentiometric method using only hydrogen electrode as indicator electrode and calomel electrode to determine pH value, Weak acid and strong base titration curve and determination of dissociation constant ( $K_a$ ) of weak acid. <b>Potentiometry:</b> Introduction and interpretation of Potentiometry, Importance of indicator and reference electrode in measurement of EMF <b>E.M. F. method:</b> Study of acid –base titration, redox titration, Argentometric titration including the mixture of $Cl^-$ , $Br^-$ , $I^-$ with graph and proper explanation
<b>3</b>	<b>NMR Spectroscopy</b> Introduction, Principle, Nuclear quantum number, equivalence and nonequivalent protons with illustrations; enantiomeric and diastereomeric protons, shielding and de shielding proton, Chemical Shift, Paramagnetic anisotropic effect, Relative intensity of signals, Spin-spin coupling and coupling constant, Deuterium labeling.
<b>4</b>	<b>Mass Spectroscopy</b> Introduction, Classification of spectroscopy origin and basic principles, Instrumentation, General Fragmentation modes, important features for mass spectra of alkanes. Applications of UV, IR, NMR Spectroscopy for structure elucidation of organic molecules.

### **Learning Outcomes:-**

After the successful completion of the course, students will be able to

- Understand various concepts NMR and Mass Spectroscopy.
- Concept of pH and potentiometry.
- Understand about various principles of Ion exchange and Gas chromatography.
- They can be able to apply basics into their experiment as well as their routine life.

### **Books Recommended:**

1. 'Instrumental Methods of Chemical Analysis', Chatwal Gurdeep R., Himalaya Pub. House
2. 'Instrumental methods of chemical analysis', B. K. Sharma, Krishna prakashan Merut.
3. 'Basic concept of Analytical Chemistry', S. M. Khopkar,
4. 'Analytical Chemistry: An Introduction', D.A. Skoog, D.M. West and F.J. Holler, 5<sup>th</sup> Edition
5. 'Spectroscopy of Organic Compound', P. S. Kalsi, New Age Publication

### **E-resources:**

1. [http://en.wikipedia.org/wiki/Nuclear\\_magnetic\\_resonance\\_spectroscopy](http://en.wikipedia.org/wiki/Nuclear_magnetic_resonance_spectroscopy)
2. [http://www.premierbiosoft.com/tech\\_notes/mass-spectrometry.html](http://www.premierbiosoft.com/tech_notes/mass-spectrometry.html)
3. <http://www.seafriends.org.nz/dda/ph.htm>
4. <http://teaching.shu.ac.uk/hwb/chemistry/tutorials/chrom/gaschrom.htm>
5. <http://www.chemicool.com/definition/potentiometry.html>



# **C. U. SHAH UNIVERSITY**

## **FACULTY OF SCIENCE** **DEPARTMENT OF CHEMISTRY**

**COURSE: B.Sc.**

**SEMESTER: VI**

**SUBJECT NAME: Industrial Chemistry-II**

**SUBJECT CODE: 4SC06CHE1**

**Teaching & Evaluation Scheme:-**

Teaching hours/week				Credit	Evaluation Scheme/semester							
Th	Tu	Pr	Total		Theory				Practical			Total Marks
					Sessional Exam		University Exam		Internal		University	
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

**Objectives:-**

- To understand Industrial chemistry and manufacturing pathways.
- To learn basic principle of Paints, Varnish, Lubricants, Rubber etc.
- To understand the Explosive and Propellants materials.

**Prerequisites:-**

Before studying Industrial chemistry, all students have basic knowledge of types of organic, industrial manufacturing reaction. Synthesis of different solvents.

**Course outline:-**

Sr. No.	Course Contents
1	<b>Paints &amp; Pigments:</b> <b>Paints:</b> Introduction, classification, distempers, constituent of paints, manufacturing of paints, setting of paints, requirements of good paints, Emulsion paint, constituent of emulsion paints, methods of manufacturing, Chemical action of emulsion paints, Latex, luminescent, fire retardant and heat resistant paints, Properties and manufacturing of Varnish. <b>Pigments:</b> Introduction, white pigments, white lead, manufacturing methods, Characteristics and uses of pigments.
2	<b>Lubricants:</b> Introduction, Properties of lubricants, Classification of lubricants, Substance used as lubricants, Additives for lubricants oil, Lubricants of mineral origin, synthetic lubricants, Greases, lubricants greases, chemical properties of greases, solid lubricants, lubricants emulsion, some test carried out on lubricants, cutting fluids, selection of lubricants, lubricating oil classification and their uses for different types of machinery.



<b>3</b>	<b>Rubber and Fiber:</b> Introduction, importance of rubber, rubber plants, types of rubber, Cyclo rubber, Latex, coagulation of rubber, crude natural rubber, Guttapercha, refining of crud rubber, drawbacks of raw rubber, rubber fabrication, Vulcanization, techniques of vulcanization, properties of vulcanized rubber, physical and chemical properties of rubber, classification of rubber, synthetic rubber. Introduction and properties of SBR, Neoprene, Buna N, butyl, Thiokol and silicon rubber.
<b>4</b>	<b>Explosive and Propellants:</b> <b>Explosive:</b> Introduction, Classification, Characteristics of explosive, Preparation and application of explosive, Oxygen balance, Blasting fuels, Rocket Propellants, Atom and Hydrogen bomb <b>Propellants:</b> Introduction, Classification, Characteristic and application of propellants

### **Learning Outcomes:-**

After the successful completion of the course, students will be able to understand

- Industrial reactions and manufacturing of rubber, paints and lubricant.

### **Books Recommended:-**

1. Industrial Chemistry' by B.K. Sharma
2. Handbook of Industrial chemistry by Mohammad Farhat Ali
3. Introduction to Chemical Engineering Kinetics and Reactor Design, 2nd Edition by Charles G. Hill, Thatcher W. Root
4. Homogeneous Catalysis: Mechanisms and Industrial Applications, 2nd Edition by SumitBhaduri, DobleMukesh

### **E-Resource**

1. <http://www.mponline.gov.in/Portal/Examinations/MPPSC/Admin/Home.aspx>
2. <http://en.wikipedia.org/wiki/Pigment>
3. <http://en.wikipedia.org/wiki/Paint>
4. <http://www.compoundchem.com/2014/03/21/inorganic-pigment-compounds-the-chemistry-of-paint/>
5. <http://www.earthpigments.com/natural-paints/>
6. <http://www.maklubes.com/displayselector/IndustrialLubricants.aspx>
7. [http://en.wikipedia.org/wiki/Natural\\_rubber](http://en.wikipedia.org/wiki/Natural_rubber)
8. <http://www.finitefiber.com/techserv.html>



# **C. U. SHAH UNIVERSITY**

## **FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY**

**COURSE: B.Sc.**

**SEMESTER: VI**

**SUBJECT NAME: Biochemistry**

**SUBJECT CODE: 4SC06CHE2**

**Teaching & Evaluation Scheme:-**

Teaching hours/week				Credit	Evaluation Scheme/semester							
Th	Tu	Pr	Total		Theory				Practical			Total Marks
					Sessional Exam		University Exam		Internal		University	
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

### **Objectives:-**

- The course will help the student to have a good understanding of the nutrition.
- To understand the detailed description as well as role of macromolecules in the human body.

### **Prerequisite:-**

Students should have knowledge about basic concepts of nutrition and biomolecules.

### **Course outline:-**

Sr. No.	Course Contents
1	<b>Lipids</b> Organic chemistry of biomolecules, occurrence and composition of fats, hydrolysis of fats, Soaps, Micelles, Fats as sources of pure acids and alcohols, Unsaturated fats, Hardening of oils, Drying oils, Phosphoglycerides, Phosphate esters, Phospholipids and cell membranes, Biosynthesis of fatty acids, Steroids, Cholesterol, Bile acids, prostaglandins, Acetyl Co-enzyme A.
2	<b>Amino acids, Proteins:</b> Proteins, Isoelectric point of amino acids, Preparation of amino acids, Peptides. Geometry of the peptide linkage, Determination of structure of peptide, Classification and function of Proteins, Denaturation, Structure of proteins, Electrophoresis, Conjugated proteins. Prosthetic group. Coenzymes. <b>Nucleic acid:</b> Nucleosides, Nucleotides, Bioenergetics, ATP and bioenergetics, Nucleic acids, Structure of DNA, RNA, DNA fingerprinting.
3	<b>Hormones:</b> Hormones - Definition and classification- Thyroid hormone- thyroid function test, male sex hormones and female sex hormone.



<b>4</b>	<b>Enzymes, Co enzymes and Vitamins</b> Biological catalysis, Classification, Specificity of enzyme action, Mechanism of enzyme action, Chymotrypsin, Co enzyme, Function of Co enzymes, Mechanism of action of a carboxypeptidase, Vitamins (Co factor of enzymes), Classification of vitamins, Mechanism of action of some coenzymes.
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### **Learning outcomes:**

- The students would have gained knowledge of the Biomolecules.
- Knowledge of the role of Biomolecules in living system would have been gained.

### **Books Recommended**

1. Biochemistry by U. Satyanarayana, Books & Allied Pvt. Ltd. (2008) ISBN-13: 978-8187134800
2. Fundamentals of Biochemistry by Ahil Chandra Deb, New Central Book Agency Pvt. Ltd, 9<sup>th</sup> revised edition (2001), ISBN-13: 978-8173811449
3. Medical Biochemistry by N. Mallikarjuna Rao, New age international publisher, (2008) ISBN-13: 978-8122418231
4. Instant Notes in Biochemistry by B.D. Hames, N.M. Hooper, Bios Scientific Pub Ltd, 2<sup>nd</sup> edition (2000) ISBN-13: 978-0387916026
5. Textbook of Biochemistry and Human Biology, by Srivastava L.M., Talwar G.P., PHI; 3<sup>rd</sup> edition (2002) ISBN-13: 978-8120319653

### **E-resources**

1. <http://en.wikipedia.org/wiki/Biochemistry>
2. [http://en.wikipedia.org/wiki/Nucleic\\_acid](http://en.wikipedia.org/wiki/Nucleic_acid)
3. [http://www.accessexcellence.org/RC/AB/BA/DNA\\_Fingerprinting\\_Basics.php](http://www.accessexcellence.org/RC/AB/BA/DNA_Fingerprinting_Basics.php)



# **C. U. SHAH UNIVERSITY**

## **FACULTY OF SCIENCE** **DEPARTMENT OF CHEMISTRY**

**COURSE: B.Sc.**

**SEMESTER: VI**

**SUBJECT NAME: Chemistry in Everyday Life**

**SUBJECT CODE: 4SC06CHE3**

**Teaching & Evaluation Scheme:-**

Teaching hours/week				Credit	Evaluation Scheme/semester							
Th	Tu	Pr	Total		Theory				Practical			Total Marks
					Sessional Exam		University Exam		Internal		University	
					Marks	Hrs	Marks	Hrs	Pr	TW		
4	0	0	4	4	30	1.5	70	3	--	--	--	100

### **Objectives: -**

A study of this subject will give information regarding the utility products viz. cleansing property of toilet soaps, detergents function, non-nutritive chemicals present in the packed food items, soft drinks.

### **Prerequisites:-**

Chemistry is a practical art. In our everyday life we come across with 30 many utility materials which all are contributions of Chemistry whether it is food, cloth, drugs, cosmetics and what not. A common knowledge of all the fundamental chemistry behind these utility products will enable us to choose what is essential and discard what are harmful to our life.

### **Course outline:-**

Sr. No.	Course Contents
1	<b>Food additives</b> Functional food additives, adulteration, food laws, Food colours-permitted and non-permitted – Toxicology, Flavours – natural and synthetic – Toxicology other functional additives, Soft drinks – formulation, Health drinks, Analysis of food analysis.
2	<b>Soaps</b> Introduction, detergent action of soap, Toilet soap, bathing bars, washing soaps, liquid soap manufacture – Batch process, cold process, hot process – semi boiled process, boiled process, Additives, fillers and flavours, Significances of acidity and alkalinity, <b>Detergents</b> Introduction, Detergent action, types of detergents – cationic, anionic, amphiphilic detergents, Common detergent chemicals, Additives, excipients colours and flavours. Enzymes used in commercial detergents, Environmental Hazards.



<b>3</b>	<b>Cosmetics</b> Introduction, classification – bathing oils, Face creams, toilet powder, skin products, dental cosmetics, hair dyes, shaving cream, shampoo, General formation for each types, Toxicology of cosmetics.
<b>4</b>	<b>Plastics</b> Plastics in daily use, Polymerization process (brief), Thermosetting and thermoplastic polymers, Use of PET, HDPE, PVC, LDPE, PP, PS, ABS, and others, Recycling of plastics, Biodegradable plastics, Environmental Hazards of plastics, Paper news print, writing paper, paper boards, cardboards, Organic materials, wood, cotton, Jute, coir – International Universal recycling codes and symbols for identification.

### **Learning outcomes:**

The students would have gained knowledge of the Chemistry utility materials like food, cloth, drugs, cosmetics, plastics, etc.

### **Books Recommended**

1. T.P. Coultate, Food – The Chemistry of its components. Royal Society of Chemistry London, (paperback)
2. ShashiChowls, Engineering Chemistry, DarpatRai Publication.
3. B.K. Sharma, Industrial Chemistry.
4. CNR Rao, Understanding Chemistry, Universities Press

### **E-resources**

1. [www.foodsmart.govt.nz/elibrary/food-additives.pdf](http://www.foodsmart.govt.nz/elibrary/food-additives.pdf)
2. [www.cleaninginstitute.org/assets/1/.../soapsanddetergentsbook.pdf](http://www.cleaninginstitute.org/assets/1/.../soapsanddetergentsbook.pdf)
3. [www.epa.gov/ttnchie1/ap42/ch06/final/c06s08.pdf](http://www.epa.gov/ttnchie1/ap42/ch06/final/c06s08.pdf)
4. [www.drugscontrol.org/pdf/cond\\_mfg\\_cosmetics.pdf](http://www.drugscontrol.org/pdf/cond_mfg_cosmetics.pdf)
5. [www.unep.org/yearbook/2014/PDF/chapt8.pdf](http://www.unep.org/yearbook/2014/PDF/chapt8.pdf)





# **C. U. SHAH UNIVERSITY**

## **FACULTY OF SCIENCE** **DEPARTMENT OF CHEMISTRY**

**COURSE: B.Sc.**

**SEMESTER: VI**

**SUBJECT NAME: Chemistry Practical-VI**

**SUBJECT CODE: 4SC06CHP1**

**Teaching & Evaluation Scheme:-**

Teaching hours/week				Credit	Evaluation Scheme/semester							
Th	Tu	Pr	Total		Theory				Practical			Total Marks
					Sessional Exam		University Exam		Internal		University	
					Marks	Hrs	Marks	Hrs	Pr	TW		
0	0	12	12	6	--	--	--	--	20	10	70	100

**Objectives:-**

- To understand the separation and identification of inorganic mixture
- To learn practical principles related to organic chemistry and physical chemistry
- To create interest in students in learning basic chemistry.

**Prerequisites:-**

Before studying practical of analytical chemistry, all students have basic knowledge of inorganic and organic compounds, properties, molecular structure and knowledge related to UG level chemistry.

**Course outline:-**

Sr. No.	Course Contents
1.	<b>Refractometer</b> 1. To determine specific refractivity and molecular refractivity of given pure liquid A, B, C, D. 2. To determine specific refractivity and molecular refractivity of glycerin (10%, 5%, 2.5%) and unknown glycerin solution. <b>Potentiometry</b> 1. To determine normality and dissociation constant of benzoic acid using 0.1N NaOH. 2. To determine normality of given acid xNHCl using NaOH solution. 3. To determine normality and dissociation constant of benzoic acid using 0.1N NaOH.



	<p><b>Polarimeter</b></p> <p>1. To determine specific rotation of three different concentration (10%, 5%, 2.5%) of dextrose solution. From graph find out the unknown concentration by plotting concentration v/s rotation angle.</p> <p>2. Study the inversion rate of sugar in presence of 1N HCl and determine the rate of reaction.</p> <p><b>Surface tension:</b></p> <p>1. Find the surface tension of the liquids A, B, and C by using Dropweight method. Find the value of Parachor of liquids and -CH<sub>2</sub> group.</p>
2.	<p><b>Inorganic Qualitative Analysis:</b> Qualitative Analysis of inorganic mixture containing four/Six radicals.</p> <p>Gravimetric Analysis</p>
3.	<p><b>Chromatography</b></p> <p>a. Separation of a mixture of amino acids</p> <p>b. Separation of a mixture of metal ions</p>

**Learning outcomes:-**

After the successful completion of the course, students will be able to:

- Understand basic principal of chemistry practical's
- Understand Qualitative Analysis of an inorganic mixture by separation method
- Understand the Refractometer, Potentiometry Polarimeter

**Books for References:**

1. 'Textbook of quantitative analysis, A. I. Vogel.
2. 'Textbook of quanlitative analysis, A. I. Vogel.
3. Experimental physical chemistry by R. C. Das & B. Bahera 'Practical in inorganic chemistry & analytical chemistry', H.G. Raval, Nirav&RupalPrakashan.

**E-Resources:-**

1. <http://pubs.acs.org/journal/inocaj>
2. [http://www.chemlin.de/chemistry/inorganic\\_chemistry.htm](http://www.chemlin.de/chemistry/inorganic_chemistry.htm)
3. <http://www.anorg.chem.uu.nl/home/index.html>
4. <http://www.springer.com/chemistry/inorganic+chemistry/journal/11502>
5. <http://libguides.stanford.edu/content.php?pid=149720&sid=1271547>
6. <http://www.science.uwaterloo.ca/~cchieh/cact/applychem/inorganic.html>



# C. U. SHAH UNIVERSITY

**FACULTY OF: - Science**

**DEPARTMENT OF: - English**

**SEMESTER: - VI**

**CODE:- 4SC06PEF1**

**NAME: – Professional Etiquettes-2**

**Teaching & Evaluation Scheme:-**

Subject Code	Subject Name	Teaching Schemes (Hours)				Cre dit	Evaluation Schemes							
		Th	Tu	Pr	To		Theory				Practical (Marks)		Uni ver sity	Tota l
											Internal			
							Sessional Exam		University Exam		Pr	TW		
							Marks	Hours	Marks	Hours				
4SC06PEF1	Professional Etiquettes-2	1	0	2	3	2	20	1	50	2	20	10	0	100

**Detail Course Content:**

Unit No.	Detailed Contents
	<b>Section-A</b>
<b>1</b>	<b>Interview</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Importance</li> <li>• Procedure</li> <li>• Types</li> <li>• Qualities observed by the employer</li> <li>• Frequently asked questions</li> <li>• Failure factors</li> <li>• Practice of interview and revision of important aspects of interview</li> </ul>
<b>2</b>	<b>Group Discussion</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Importance</li> <li>• Characteristics of successful group discussion</li> <li>• Types</li> </ul> <b>Debate</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Difference between group discussion and debate</li> <li>• Importance</li> <li>• Assessment criterions</li> </ul>
<b>3</b>	<b>Public Speaking</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Difference between presentation and public speaking</li> <li>• Qualities of good speaker</li> <li>• Non verbal communication</li> </ul> <b>Technical Presentation/Talk</b>



	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Preparing technical presentation</li> <li>• Language of the presentation</li> <li>• Using technological aids for presentation</li> </ul>
<b>4</b>	<b>Resume Building</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Difference between curriculum vitae and resume</li> <li>• Types</li> <li>• Formats</li> <li>• Sample of resumes</li> </ul>
<b>5</b>	<b>Official (Job) Letters</b> <ul style="list-style-type: none"> <li>• Cover letter/job application: solicited &amp; unsolicited</li> <li>• Follow-up application</li> <li>• Job acceptance letter</li> <li>• Job refusal letter</li> <li>• Resignation letter</li> <li>• Termination letter</li> <li>• Relieving letter</li> </ul>
<b>6</b>	<b>Circular, Memorandum</b> <ul style="list-style-type: none"> <li>• Objectives of circular and memorandum</li> <li>• Drafting circular and memorandum</li> </ul>
<b>7</b>	<b>Technical Research Paper and Thesis/Dissertation</b> <ul style="list-style-type: none"> <li>• Introduction to research paper, thesis and dissertation</li> <li>• Types of research paper</li> <li>• Difference between research paper and article</li> <li>• Elements in research paper</li> <li>• Writing components: language, vocabulary, punctuation, cohesion, clarity etc.</li> </ul>
<b>8</b>	<b>Competitive Exam Guidance</b> <ul style="list-style-type: none"> <li>• Introduction to various competitive exams conducted by government</li> <li>• How to crack the competitive examination-tips</li> <li>• Major areas for preparation</li> <li>• Helping tools: websites, magazines, newspapers, employment news papers</li> </ul>
	<b>Section-B</b>
<b>9</b>	<b>Wings of Fire by Abdul Kalam-Propitiation &amp; Contemplation Chapters</b>



**References:**

<b>Sr No.</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>
1	Effective Personal Communication Skills for Public Relations	Green Andy	Kogan age Limited
2	Advanced Buisness Communication	John M. Penrose Jr., Robert W. Rasberry, Robert J. Myers	Thomason/South-Western
3	Technical Communication	D.K.Chakradev	Tech-max Publication
4	Basic Buisness Communication	Flatly and Lesikar	
5	From Sentence to Paragraph	William J. Kelly and Deborah L. Lawton	Longman
6	Technical Communication: Principles and Practice	Meenaxi Raman & Sangeeta Sharma	Oxford University Presss
7	Principles and Practice of Business Communication	Rhoda Doctor	Sheath publishers
8	Effective Technical Communication	M Ashraf Rizvi	Tata Mc Graw hill
9	Personality Development and Soft Skills	Mitra Barun	OUP
10	Resumes and Interviews	M Ashraf Rizvi	Tata Mc Graw hill
11	Business Communication	Asha Kaul	Prentice-Hall of India Ltd
12	Business Communication	Lesikar Raymond V & Pettit John D	AIIBS Publishers & Distributers
13	Hand Book of Practical Communication Skills	Chrissie Wrought	Jaico Publishing House
14	Communication Today – Understanding Creative Skills	Ray Reuben	Himalaya Publishing House
15	Managing Soft Skills for Personality Development	B.N. Ghosh	Tata Mc Graw hill
16	Wings of Fire	Abdul Kalam	University Press