Teerthanker Mahaveer University
Faculty of Engineering
B.Sc. (H) Chemistry

Programme Outcomes (POs)

PO–1	Critical thinking - This is based on the assumption, thinking and actions. These assumptions are tested for accuracy & validity taking into consideration the ideas and decisions. These ideas may be collected from intellectual organization or personal from different prospectus.
PO–2	Effective communication- Effective communication an important tool to enhance the effectiveness of learning among the students. The speaking, reading & writing must be followed correctly.
PO–3	Social interaction –Social interaction also play important role to reads the conclusion in group settings.
PO–4	Effective citizenship- This contributes in the national development and promptness to achieve the goals. It develops awareness through volunteering.
PO–5	Ethics- It has direct impact to recognize the different value systems. It gives proper understanding in different dimension for making decisions.
PO–6	Environment and sustainability- Essential to understand the environmental issues & sustainable development.
PO–7	Self directed & lifelong learning – Acquire the ability to engage in independent and life- long learning in broad spectrum including socio technological changes.
PO- 8	Problem analysis & Solving: Identify, formulate, research literature, and analyze complex basic sciences problems reaching substantiated conclusions using first principles of mathematics, natural sciences.
PO- 9	Entrepreneurship: An Entrepreneurship cut across every sector of human life including the field of engineering, engineering entrepreneurship is the process of harnessing the business opportunities in engineering and turning it into profitable commercially viable innovation.
PO- 10	Interpersonal skills: Interpersonal skills involve the ability to communicate and build relationships with others. Effective interpersonal skills can help the students during the job interview process and can have a positive impact on your career advancement.
PO- 11	Technology savvy/usage: Being technology savvy is essentially one's skill to be smart with technology. This skill reaches far beyond 'understanding' the concepts of how technology works and encompasses the 'utilization' of such modern technology for the purpose of enhancing productivity and efficiency.

Programme Specific Outcomes (PSO's)

PSO-1	Understanding the basic information of chemistry including symbols, types of bonds, structure, definitions etc.
PSO-2	Remembering basic concept of chemistry including classification & properties of elements, functional groups, formation of bonds and configuration of compounds.
PSO-3	Applying chemical synthesis of compounds, various types of chemical reactions, physicochemical analysis and identification of compounds.
PSO-4	Executing the known techniques to analysis of new compounds, elemental analysis for percentage determination and establishing the molecular formula and structure by modern techniques like IR, NMR, and Raman Spectroscopy etc.
PSO-5	Developing new derivatives of the existing compounds and study their physical and chemical properties and comparative studies for various derivatives of existing compounds and can grow evaluating aptitude.
PSO-6	Facing all types of competitions and challenges with confidence

Course Outcomes (CO's)

BAS113	**CO1**	Understanding the concepts of Limit, Continuity and Differentiability of functions.
	CO2	Understanding the concepts of differential equation in one- & two-dimensions heat transformation equations
	CO3	Understanding the concepts of eigenvalue & eigen vectors of matrices
	CO4	Understanding concepts of curvilinear systems and application of vector Integration in finding Area, Volume & Moment of Inertia
BAS111	**CO1**	Understanding the concept of modern atomic structure, Periodicity of elements and Chemical reactions
	CO2	Understanding the Schrodinger's wave equation to explain the origin of quantum numbers & standard electrode potential.
	CO3	Understanding the theories of chemical bonding & Born Haber's cycle.
	CO4	Applying theories of chemical bonding to know the characteristics of molecules.
	CO5	Analyzing the relationship between Ionization potential , reactivity of metals , electron gain enthalpy & reactivity of non-metals.
BAS111	**CO1**	Understanding the concept of kinetic theory of gases and behavior of real gases.
	CO2	Understanding the effect of solute and temperature on the physical properties of liquids.
	CO3	Understanding the elements of symmetry, crystal structure of ionic compounds

	CO4	Analyzing the Ionization of electrolytes, acid- base indicators, salt hydrolysis and buffer action.
	CO5	Applying the concepts of Ionic Equilibria to determine the degree of ionization Ionization constant
TMUGE101	**CO1.**	Remembering and understanding of the basic of English grammar and vocabulary.
	CO2.	Understanding of the basic Communication process.
	CO3.	Applying correct vocabulary and tenses in sentences construction.
	CO4.	Analyzing communication needs and developing communication strategies using both verbal & non-verbal method.
	CO5.	Drafting applications in correct format for common issues.
	CO6.	Developing self-confidence.
BAS111	**CO1**	Remembering the concepts of Newtonian Mechanics of general bodies.
	CO2	Understanding the concepts of rotational dynamics of bodies, gravitation, central forces, Oscillatory motion, Elasticity and fluid motions.
	CO3	Understanding the frames of reference and fundamentals of special theory of relativity
	CO4	Applying the concepts of gravitation for understanding the motion of satellite and planets
	CO5	Applying the concept of relativity in understanding the phenomenon of time dilation mass energy equivalence twin paradox and relativistic addition of velocities
BAS117	**CO1**	Understanding the concepts of trigonometric functions, hyperbolic functions, inverse circular and inverse hyperbolic functions of complex quantities.
	CO2	Understanding the concept of Successive differentiation and partial differentiation.
	CO3	Understanding the concepts of envelopes, evolutes, curvature and asymptotes of curves in Cartesian and polar coordinates.
	CO4	Applying the concept of Leibnitz's theorem for successive derivatives.
	CO5	Applying the concept of tangent, normal and asymptotes to tracing of curves in Cartesian, parametric and polar coordinates.
BAS166	**CO1**	Remembering of basic concepts of pendulums like Bar & Kater's pendulums and measuring the value of g.
	CO2	Understanding of Kinematics of oscillating and bending bodies
	CO3	Understanding and measuring the random errors in experiments.
	CO4	Applying time period concepts to determine the acceleration due to gravity, moment of inertia & young modulus using bar, kater's pendulum, mass spring system, fly wheel & cantilever.
	CO5	Applying Poiseuille's equation to determine coefficient of viscosity & sextant to determine the height of building.

	CO5	Analyzing the mechanical processes in performing the experiments.
BAS173	**CO1**	Understanding the different coordinate systems of reference by plotting curves in a plane using its mathematical properties
	CO2	Understanding the graphs of polynomial in Physical Sciences
	CO3	Understanding the Matrix operations for quantum applications.
	CO4	Analyzing complex numbers and their representations.
	CO5	Analyzing the area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.
BAS167	**CO1**	Describe the usage of computers and why computers are essential components in business and society.
	CO2	Utilize the Internet Web resources and evaluate on-line e-business system
	CO3	Solve common business problems using appropriate Information Technology applications and systems.
	CO4	Identify categories of programs, system software and applications. Organize and work with files and folders.
	CO5	Describe various types of networks network standards and communication software.
BAS164	**CO1**	Remembering & understanding the concept of Normality & Molarity.
	CO2	Estimation of carbonates, bicarbonates & hydroxides by acids base titrations.
	CO3	Estimation of free alkalies presents in soaps & detergent by acids base titrations.
	CO4	Estimation of strength of Fe(II) in the given sample by by Oxidation- Reduction Titrimetric.
	CO5	Estimation of oxalic acid and sodium oxalate in given mixture by Oxidation-Reduction Titrimetric
BAS165	**CO1**	Determining the surface tension of aqueous solution by using stalagmometer.
	CO2	Determining the surface tension of aqueous solution by using Ostwald's viscometer.
	CO3	Analyzing the effect on change in pH by addition of acid/ base.
	CO4	Preparing the buffer solution of different pH range.
	CO5	Determining the strength of an acid using pH meter.
TMUGA101	**CO1**	Solving complex problems using Criss cross method, base method and square techniques.
	CO2	Applying the arithmetical concepts of Average, Mixture and square techniques.
	CO3	Applying the arithmetical concepts of Average, Mixture and Allegation.
	CO4	Evaluating the different possibilities of various reasoning based problems in series, Blood relation and Direction.
	CO5	Operationalizing the inter-related concept of Percentage in Profit Loss and Discount, Si/CI and Mixture/Allegation.

BAS201	**CO1**	Understanding basic concepts of organic Chemistry regarding nomenclature hybridization electronic displacements, electrophilic and Nucleophilic reagents & type of organic reactions.
	CO2	Understanding & remembering the chemistry of alkanes, alkenes, alkynes, aromatic electrophilic substitution along with directive influence of groups.
	CO3	Understanding the electronic displacement concept, relative strength of acid and base relative stability, elimination v/s substitution known mechanism of various organic reactions.
	CO4	Analyzing the concept of stereochemistry, relative and absolute control of organic molecule can be known.
	CO5	Applying the concept of stereochemistry in relative and absolute control organic molecule can be known.
BAS212	**CO1**	Understanding the concept of heat, work, internal energy.
	CO2	Understanding the entropic changes for reversible & irreversible processes.
	CO3	To understand & apply Gibb's & Helmholtz equations & its impact on temperature, volume & pressure.
	CO4	Understanding the physical & chemical equilibria & application of Le Chatelier principles.
	CO5	Determining the molecular masses of ionic & organic compounds by using colligative properties.
TMUGE201	**CO1**	Remembering & understanding the basics of English Grammar and Vocabulary.
	CO2	Understanding the basics of Listening, Speaking & Writing Skills.
	CO3	Understanding principles of letter drafting and various types of formats.
	CO4	Applying correct vocabulary and grammar in sentence construction while writing and delivering presentations.
	CO5	Analyzing different types of listening role of Audience & Locale in presentation.
	CO6	Drafting Official Letters, E-Mail & Paragraphs in correct format.
BAS220	**CO1**	Remembering the concepts of optical phenomena like reflection, refraction, interference, diffraction & waves.
	CO2	Understanding the principles of divisions of waves.
	CO3	Applying the Fermat's principle to understand the optical phenomena.
	CO4	Applying the concept of superposition of waves to draw the Lissajous Figures.
	CO5	Applying the concept of diffraction phenomenon or using to single and multi-slit to find out the dispersive and resolving power of different optical devices like telescope, microscope and gratings.
	CO6	Applying the concept of interference and diffraction phenomenon to Construct and reconstruct the holograms using two plane waves as well as zone plates.
BAS231	**CO1**	Understanding basic concept of sets, relation, algebraic structure, Logic

		gates like countable set, equivalence relation, group, k-maps.
	CO2	Understanding the basic concept of truth table, recurrence relation like tautology contradiction.
	CO3	Applying the concept of relation to find out the equivalence relation, one-one, onto & into.
	CO4	Applying the concept of relation to find out the equivalence relation, one-one, onto & into.
	CO5	Applying the concept of truth table to find out the tautology, contradiction & contingency.
BAS266	**CO1**	Remembering the concepts of optical properties and character of lights.
	CO2	Understanding the concepts to measure the focal lengths of concave, convex lenses and mirrors.
	CO3	Applying the concepts of Schuster's method for optical adjustment of spectrometer.
	CO4	Analyzing the diffraction and interference patterns obtained from different optical instruments.
	CO5	Analyzing the dispersive power to verify the prism materials.
BAS271	**CO1**	Understanding simple program modules to implement single numerical methods and algorithms.
	CO2	Applying to use basic flow controls (if-else, for, while).
	CO3	Applying Test program output for accuracy using hand calculations and debugging techniques
	CO4	Applying multiple program modules into larger program packages
	CO5	Analyzing the generate plots and export this for use in reports and presentations.
TMU201	**CO1**	Understanding environmental problems arising due to constructional and developmental activities.
	CO2	Understanding the natural resources and suitable methods for conservation of resources for sustainable development
	CO3	Understanding the importance of ecosystem and biodiversity and its conservation for maintaining ecological balance.
	CO4	Understanding the types and adverse effects of various environmental pollutants and their abatement devices.
	CO5	Understanding Greenhouse effect, various Environmental laws, impact of human population explosion, environment protection movements, different disasters and their management.
BAS264	**CO1**	Purification of organic compounds by crystallization.
	CO2	Determination of the melting points of above compounds and unknown organic compounds
	CO3	Understanding the effect of impurities on the melting point of organic compounds

	CO4	Separation of mixture of organic compounds by Thin Layer Chromatography TLC
	CO5	Determination of purity of the organic compounds by mixed melting point & TLC
BAS265	**CO1**	Determination of heat capacity of calorimeter, enthalpy of ionization and neutralization of acids.
	CO2	To study the calculation of the enthalpy of ionization of ethanoic acid.
	CO3	To determine Surface tension and Viscosity of aqueous solutions.
	CO4	Determination of enthalpy of hydration of copper sulphate.
	CO5	Determination of solubility of benzoic acid in water.
TMUGA-201	**CO1**	Applying the arithmetical concepts in Ratio Proportion Variation.
	CO2	Employing the techniques of Percentage; Ratios and Average in inter
	CO3	related concepts of Time and Work, Time Speed and Distance.
	CO4	Identifying different possibilities of reasoning based problems of Syllogisms and Venn diagram.
	CO5	Examining the optimized approach to solve logs and Surds.
BAS311	**CO1**	Understanding the concept of Acid & Bases and its application.
	CO2	Understanding the Chemistry of main group elements i.e s & p block elements
	CO3	Understanding the Chemistry of Inorganic polymers & its industrial applications
	CO4	Applying theories of chemical bonding to know the characteristics of molecules
	CO5	Identifying the relationship between various physical & chemical properties of main group elements.
BAS312	**CO1**	Remembering the basic concept and methods of preparation of Halogenated Hydrocarbons Alcohols, Phenols, Ethers and Epoxides
	CO2	Remembering the basic concept and methods of preparation of Carbonyl Compounds and Carboxylic Acids and their Derivatives.
	CO3	Understanding the structure and reaction mechanisms of Halogenated Hydrocarbons, Alcohols & Phenols.
	CO4	Understanding the structure and reaction mechanisms of Ethers and Epoxides & Sulphur containing compounds.
	CO5	Understanding the structure and reaction mechanisms of Carbonyl Compounds, Carboxylic Acids and their Derivatives.
BAS313	**CO1**	Understanding the concept of phases, component and degree of freedom and its applications to various phase diagrams.
	CO2	Understanding of phase equilibria in detail. Application of Nernst distribution law.
	CO3	Applying Chemical kinetics to various reactions.
	CO4	Understanding Arrhenius theory and other theories of reaction rates.

	CO5	Remembering catalysis and surface chemistry.
TMUGE301	**CO1**	Understanding knowledge of grammar to face competitive exams.
	CO2	Understanding advance English language by using variety of words i.e idioms and phrase in variety of sentences in functional context.
	CO3	Understanding listening for effective communication.
	CO4	Applying their English grammar knowledge in day to day context.
	CO5	Applying writing and comprehensive skills in English.
	CO6	Analyzing Comprehending & enriching their vocabulary through prescribed text.
BAS314	**CO1**	Remembering concepts of Black body radiation, Photoelectric effect and Compton scattering to learn the beginning of quantum mechanics.
	CO2	Understanding Young's two slit interference of light into the two slit interference of particles (e.g. photon, electron, atom etc.)
	CO3	Understanding the matter wave and deducing the Schrodinger wave equation.
	CO4	Understanding the laws of radioactive decay including alpha-, beta- and gamma decay, fission and fusion nuclear process.
	CO5	Applying the Heisenberg's uncertainty principle to deduce the Size and structure of atomic nucleus and its relation with atomic weigh.
	CO6	Applying the Heisenberg's uncertainty principle to prove the impossibility of an electron being in the nucleus.
BAS331	**CO1**	Understanding finite differences and interpolation with equal intervals and Unequal Intervals.
	CO2	Understanding introduction of operators and its properties.
	CO3	Applying numerical solution of first order differential equation using Eulers, Picards and Runge Kutta methods and derivative using forward and backward difference interpolation.
	CO4	Analyzing Lagrange's interpolation formula for unequal intervals.
	CO5	Evaluating Numerical differentiation and Integration, Trapezoidal Formulae, Simpson's Rule, Weddle rule and Cote's formula.
BAS361	**CO1**	Volumetric estimation of copper & Chromium from given salt solution.
	CO2	Estimation of arsenite in tartar-emetic iodimetrically.
	CO3	Estimation of antimony in tartar-emetic iodimetrically.
	CO4	Estimation of available chlorine in the given solution of Bleaching powder.
	CO5	Synthesizing some transition metal complexes.
BAS362	**CO1**	Understanding qualitative analysis of organic compounds to detect the different functional groups present on it.
	CO2	Understanding the mechanism of Acetylation and applying it in preparing few organic compounds.
	CO3	Understanding the mechanism of Benzoylation and applying it in preparing

		few organic compounds.
	CO4	Understanding the mechanism of Nitration and applying it in preparing few organic compounds.
	CO5	Understanding the mechanism of reduction & applying it for preparing few organic compounds.
BAS362	**CO1**	Determining the critical solution temperature of the phenol-water system.
	CO2	Analyzing the phase diagram using cooling curves
	CO3	To study distribution of acetic/ benzoic acid between water and cyclohexane
	CO4	Analyzing the kinetics of Iodide-persulphate reaction and acid hydrolysis of methyl acetate with hydrochloric acid.
	CO5	Understanding the validity of the Freundlich and Langmuir isotherms for adsorption of acetic acid on charcoal.
TMUGA-302	**CO1**	Applying the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCF /LCM in Number System.
	CO2	Relating the rules of permutation and combination, Fundamental Principle of Counting to find the probability
	CO3	Applying calculative and arithmetical concepts of ratio, Average and Percentage to analyze and interpret data.
	CO4	Correlating the various arithmetic concepts to check sufficiency of data
TMUGS-301	**CO1**	Utilizing effective verbal and non-verbal communication techniques in formal and informal settings
	CO2	Understanding and analyzing self and devising a strategy for self- growth and development.
	CO3	Adapting a positive mindset conducive for growth through optimism and constructive thinking.
	CO4	Utilize time in the most effective manner and avoiding avoiding procrastination.
	CO5	Making appropriate and responsible decisions through various techniques like SWOT, Simulation and Decision Tree
	CO6	Formulating strategies of avoiding time wasters and preparing to-do list to manage priorities and achieve SMART goals.
BAS419	**CO-1**	Understanding basic concepts of Crystal Field Theory (CFT) & Ligand Field Theory (LFT).
	CO-2	Remembering & understanding the Isomerism in Inorganic Complexes, Lability & inertness of transition metal complexes.
	CO-3	Applying CFT in determining CFSE value, color of complexes & magnetic moment of TM complexes.
	CO-4	Understanding the Physical & Chemical properties of d block elements.
	CO-5	Understanding the Physical & Chemical properties of Lanthanides & Actinides.
BAS412	**CO-1**	Remembering the basic concept and methods of preparation of nitrogen containing compounds and their derivatives.

	CO-2	Remembering the introduction & classification of heterocyclic compounds
	CO-3	Understanding the structure & synthesis of five & six membered rings containing one hetero atom heterocyclic compounds & their derivatives and poly-nuclear hydrocarbons
	CO-4	Applying the mechanism of substitution reaction in preparing derivatives of heterocyclic compounds.
	CO-5	Understanding the isolation, structure & synthesis of alkaloids and terpenes.
BAS413	**CO-1**	Understanding the basic concept of conductance and electrochemistry.
	CO-2	Understanding the Faraday's Law of electrolysis and its applications.
	CO-3	Understanding the different types of electrochemical cells and determining the EMF of the cells.
	CO-4	Understanding the basic concept of electric and magnetic properties of molecules
	CO-5	Appling the concept of conductance measurement in degree of dissociation, equilibrium constant and conductometric titrations.
BAS418	**CO-1**	Remembering and understanding the laws of thermodynamics, entropy, and Maxwell's thermodynamic relations.
	CO-2	Understanding the Kinetic theory of gases-distribution of velocities, and molecular collisions in Physics.
	CO-3	Understanding the basics of real gases.
	CO-4	Applying the T-S diagram to understand phase transition processes
	CO-5	Applying Maxwell's thermodynamic relations to understand ideal and Vander Waal Gases, Energy equations, Change of Temperature during Adiabatic Process
BAS435	**CO-1**	Understanding the concept of the probability, addition law of probability and multiplication law of probability with its applications.
	CO-2	Applying the concept of discrete and continuous random variable to calculate the moment and generating functions
	CO-3	Analyzing the concept of mathematical expectation, addition and multiplication theorem of Expectation.
	CO-4	Analyzing the M.G.F, C.F and P.D.F of the discrete and continuous distributions
	CO-5	Evaluating the concept of Probability distributions and its recurrence relation of the distribution.
TMUGE401	**CO-1**	Remembering adequate knowledge of grammar and vocabulary through prescribed text to address competitive exams
	CO-2	Understanding the value of listening to understand the basic content.
	CO-3	Understanding the usage of English grammar in day to day context.
	CO-4	Understating about the skills required in corporate world.
	CO-5	Applying writing and comprehensive skills in English.

	CO-6	Creating a simple proposal and report.
BAS461	**CO-1**	Gravimetric Estimation of nickel (II) using Dimethylglyoxime (DMG).
	CO-2	Gravimetric estimation of Copper as CUCNS.
	CO-3	Gravimetric estimation of Iron as Fe2O3.
	CO-4	Separating mixture of inorganic compounds by Thin Layer Chromatography (TLC).
	CO-5	Preparing few metal complexes
BAS462	**CO-1**	Finding extra elements in the organic compounds.
	CO-2	Qualitative analysis of organic compounds containing simple functional groups.
BAS465	**CO-1**	Determination of cell constant.
	CO-2	Determining the equivalent conductance and dissociation constant of a weak acid by using conductivity meter
	CO-3	Analyzing the acid- base conductometric titrations curve and determining the strength of an acid.
	CO-4	Estimating the strength of an acid through potentiometric titrations.
TMUGA-402	**CO-1**	Recognizing the rules of Crypt-arithmetic and relate them to find out the solutions.
	CO-2	Illustrating the different concepts of Height and Distance and Functions.
	CO-3	Employing the concept of higher level reasoning in Clocks, Calendars and Puzzle Problems.
	CO-4	Correlating the various arithmetic and reasoning concepts in checking sufficiency of data.
TMUGS-401	**CO-1**	Communicating effectively in a variety of public and interpersonal settings.
	CO-2	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of Change.
	CO-3	Analyzing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships.
	CO-4	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust.
	CO-5	Handling difficult situations with grace, style, and professionalism
BAS525	**CO-1**	Remembering & understanding mono, di & polysaccharides, amino acids, peptides, proteins, Nuclelic acid. Enzymes & Coenzymes & concept of energy in biosystem
	CO-2	Remembering & understanding the role of Enzymes & Coenzymes in human body & concept of energy in biosystem.
	CO-3	Understanding the concept of reducing & non reducing sugars.
	CO-4	Understanding the concept of Zwitter ion, structure of peptides & nucleic acid, Characteristics of Enzyme & Coenzyme.
	CO-5	Applying knowledge in synthesis of sugar peptides, proteins, Nuclelic acid &

		role of enzyme can be assigned
BAS526	**CO-1**	Understanding the interaction of electromagnetic radiation with molecules.
	CO-2	Understanding the types of spectroscopy and their selection rules.
	CO-3	Understanding the basic principle of rotational, vibrational, Raman, electronic, NMR, ESR spectroscopy.
	CO-4	Understanding the laws of photochemistry and quantum yield.
	CO-5	Analyzing the PMR spectra of simple organic molecule.
BHM515	**CO-1**	Understanding the importance of value education in life and method of self-exploration
	CO-2	Understanding 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration.
	CO-3	Applying right understanding about relationship and physical facilities.
	CO-4	Analysing harmony in myself, harmony in the family and society, harmony in the nature and existence
	CO-5	Evaluating human conduct on ethical basis.
BAS527	**CO-1**	Remembering the Qualitative and quantitative aspects of analysis
	CO-2	Remembering & understanding the mechanism of Solvent extraction.
	CO-3	Understanding the basic principles of Optical methods of analysis.
	CO-4	Understanding the basic principles of thermal and Electroanalytical methods of analysis
	CO-5	Understanding the mechanism of chromatographic separation
BAS529	**CO-1**	Understanding the principles of Molecular modeling, information regarding the software and hardware related to it.
	CO-2	Understanding various force field used in Molecular modeling.
	CO-3	Understanding different methods of energy minimization and related methods.
	CO-4	Understanding principles of Molecular Dynamics Simulation methods.
	CO-5	Analyzing structure prediction, basic introduction to comparative modeling and Cheminformatics.
BAS563	**CO-1**	Understanding Paper chromatographic method of Fe3+, Al3+, and Cr3+.
	CO-2	Separation and identification of the monosaccharides present in the given mixture (glucose & fructose) by paper chromatography.
	CO-3	Understanding Chromatographic separation of the active ingredients of plants, flowers and juices by TLC.
	CO-4	Determining the pH of the given aerated drinks fruit juices, shampoos and soaps. Determination of Na, Ca, Li in cola drinks and fruit juices using fame photometric techniques.
	CO-5	Analyzing the soil (pH, Estimation of calcium, magnesium, phosphate, nitrate)
	CO-6	Determining of pKa values of indicator using spectrophotometry.
	CO-7	Analyzing pre-recorded IR spectroscopic data of organic compounds

BAS565	**CO-1**	Remembering methods of Structure editing and optimizations.
	CO-2	Analyzing and visualizing the electron density maps of different molecules
	CO-3	Analyzing and visualizing the electrostatic potential maps of different molecules
	CO-4	Building and minimizing organic compounds of your choice containing different functional groups.
	CO-5	Understanding the optimization of bond angles of H2O, H2S, and H2Se.
BAS561	**CO-1**	Understanding estimation of amino acids & proteins.
	CO-2	Understanding estimation of glycine by Sorenson's formalin method.
	CO-3	Understanding the effect of temperature on the action of salivary amylase.
	CO-4	Determining saponification value & Iodine value of oil & fats.
	CO-5	Understanding the action of salivary amylase on starch.
BAS562	**CO-1**	Determining the concentration of KMnO4/ K2Cr2O7 and in its mixture by using colorimeter.
	CO-2	Analyzing the kinetic study of iodination of propanone in acidic medium by using colorimeter.
	CO-3	Determining the dissociation constant of an indicator.
	CO-4	Analyzing the coloured compound and determining the λmax of that compound by using UV-VIS spectrophotometer.
	CO-5	Understanding the kinetics of interaction of crystal violet/ phenolphthalein with sodium hydroxide
BAS624	**CO-1**	Remembering the symbols of acidic and basic radicals.
	CO-2	Understanding the classification of acidic, basic radicals, group reagents used in the analysis of inorganic mixture.
	CO-3	Understanding of organo-metallic compounds, synthesis of ionic and non ionic compounds.
	CO-4	Understanding the reaction mechanism, types of reactions and kinetics of tetrahedral and octahedral complexes.
	CO-5	Applying organo-metallic compounds as catalyst in the production of industrial products.
BAS625	**CO-1**	Remembering enough knowledge of principles of UV Spectroscopy
	CO-2	Understanding Knowledge in IR Spectroscopy.
	CO-3	Understanding UV and IR application in characterize & interpretation the spectra of organic compounds.
	CO-4	Remembering enough knowledge of principles of NMR Spectroscopy and to interpret the 1H NMR spectra of unknown organic compounds
	CO-5	Students can gain enough knowledge regarding dyes, polymers, lipids & its industrial application.
BAS637	**CO-1**	Remembering the introduction & basic concepts of polymers.

	CO-2	Understanding the classification & properties of polymers.
	CO-3	Understanding the kinetics & mechanism of polymerization reaction.
	CO-4	Understanding the preparation & application of industrial & natural polymers.
	CO-5	Analyzing the molecular weight determination of polymers.
BAS638	**CO-1**	Understanding the synthesis of inorganic solids and their modification by various physical and chemical methods.
	CO-2	Understanding the importance and types of inorganic solids like Electrolytes, molecular, colored compounds and inorganic liquid crystals.
	CO-3	Understanding the preparation, structure, classification of Nano particles, nano tubes, nano-architecture and different types of nano materials.
	CO-4	Analyzing the chemical composition, mechanical and fabricating characteristics of metals, non metals and alloys.
	CO-5	Applying the various types of composites as engineering materials and environmental effects on composites.
	CO-6	Applying various types of polymers, ceramics and refractory materials and their commercial manufacturing
BAS671	**CO-1**	Synthesizing different types of industrial polymers.
	CO-2	Determination of molecular weight & hydroxyl number of polymers.
	CO-3	Estimation of the amount of HCHO in the given solution.
	CO-4	Understanding the mechanical properties of Polymers.
	CO-5	Determination of hydroxyl number of a polymer using colorimetric method
BAS672	**CO-1**	Determining the mechanism of cation exchange method.
	CO-2	Evaluating the total difference of solids.
	CO-3	Understanding the synthesis of hydrogel by co-precipitation method.
	CO-4	Understanding the synthesis of silver metal nanoparticles
	CO-5	Understanding the synthesis of gold metal nanoparticles
BAS626	**CO-1**	Remembering & understanding the Principles and Concepts of Green Chemistry and need of green chemistry in our day to day life.
	CO-2	Understanding the Measuring and Controlling Environmental Performance and Emerging Green Technology and Alternative Energy Sources in green chemistry.
	CO-3	Understanding the Emerging Green Technology and Alternative Energy Sources in green chemistry.
	CO-4	Remembering the renewable resources of energy.
	CO-5	Understanding industrial case studies to prepare the different products using greener approach..
BAS627	**CO-1**	Understanding the preparation and uses of various types of dyes, Shampoo's , cosmetics, antiperspirants and artificial flavours.
	CO-2	Understanding the importance of artificial and natural essential oils in cosmetic industries

	CO-3	Understanding the synthesis and design of various analgesic, Antipyretic, anti –inflammatory and anti-biotic drugs.
	CO-4	Understanding the nature of various drugs like antiviral, anti leprosy Drugs.
	CO-5	Applying the use of drugs for central nervous system. HIV- AIDS.
	CO-6	Applying the concept of fermentation for the production of Chemicals, drugs and vitamins
BAS663	**CO-1**	Preparing gold nanoparticles using tea leaves.
	CO-2	Preparing propene by green chemical methods.
	CO-3	Analysing the gold nanoparticles by UV/Visible spectrophotometer and other techniques.
	CO-4	Applying Benzoin condensation, mechanochemical solvent free synthesis, solvent free, microwave assisted one pot synthesis and photoreduction.
	CO-5	To study photoreduction of benzophenone to benzopinacol in the presence of sunlight.
BAS664	**CO-1**	Preparing Aspirin and analyzing it.
	CO-2	Preparing magnesium bisilicate (Antacid) & Talcum Powder.
	CO-3	Preparing shampoo & Enamels
	CO-4	Preparing hair remover & face cream.
	CO-5	Preparing nail polish and nail polish remover.
BAS661	**CO-1**	Remembering the acidic and basic radicals, symbols and group wise classification of radicals.
	CO-2	Understanding the use of group reagents and qualitative confirmation Individual acidic /basic radical.
	CO-3	Understanding the interfering acid radicals/ insoluble salts. The removal of interfering radicals/insoluble salt before the III group of basic radicals analysis.
	CO-4	Analyzing the inorganic mixture for two acidic / two basic radicals in presence of interfering radicals/insoluble salt.
	CO-5	Applying chemical methods for the laboratory preparation of metals.
BAS662	**CO-1**	Understanding the extraction of caffeine from tea leaves.
	CO-2	Preparation of sodium polyacrylate, urea formaldehyde & methyl orange.
	CO-3	Analysis of Carbohydrate: aldoses and ketoses, reducing and non-reducing sugars.
	CO-4	Qualitative analysis of unknown organic compounds containing monofunctional groups (carbohydrates, aryl halides, aromatic hydrocarbons, nitro compounds, amines and amides) and simple bifunctional groups, for e.g. salicylic acid, cinnamic acid, nitrophenols, etc
	CO-5	Identification of simple organic compounds by IR spectroscopy.
	CO-6	Understanding the mechanism of preparation of Methyl Orange.