Programme outcomes and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students

COURSE OBJECTIVES AND COURSE OUTCOMES (R15 Regulation)				
Dept.	**Year & Semester**	**Course Code**	**Course Name**	**Course Outcomes**
Chemical Engineering	**I/IV & I Sem.**	CHE111	English	By the end of the course, the student will be able to: 1. Analyze the structure of the phrases, clauses and sentences 2. Apply his enriched vocabulary to give better shape to his communication skills. 3. Effectively use different formats of business correspondence. 4. Use idiomatic expressions and foreign phrases in his communication. 5. Analyse, interpret and compose meaningful texts.
		CHE112	Engineering Mathematics I	By the end of the course, student will be able to: 1. Familiarize with functions of several variables 2. Apply Fourier series in solving boundary value problems 3. Apply the concept of three dimensional analytical geometry 4. Use mathematical tools needed in evaluating multiple integral and their usage. 5. Use the concepts of improper integrals, Gamma, Beta and Error functions which are needed in Engineering applications
		CHE113	Engineering Physics	By the end of the course, student will be able to: 1. Understand the fundamental concepts of thermodynamics. 2. Familiar with the fundamentals of electromagnetic induction and Ultrasonics. 3. Aware of the basic concepts of optics like interference, diffraction, polarization and its various applications. 4. Understand the working principle and applications of lasers and fiber optics. 5. Learn fundamentals of modern physics and its importance in modern technology.
		CHE114	Engineering Drawing	By the end of the course, student will be able to: 1. Draw various engineering curves and understand the basic geometrical constructions. 2. Prepare orthographic projections of points and lines 3. Produce orthographic projections of plane surfaces 4. Draw orthographic projections of solids in various orientations. 5. Prepare isometric projections and understand basics of Computer Aided Drafting.
		CHE115	Environmental Sciences	By the end of the course, student will be able to: 1. Identify the characteristics of various natural resources and can implement the conservation practices 2. Realize the importance of Ecosystem and Biodiversity for maintaining ecological balance 3. Classify, analyze various pollutants and can develop methods for solving problems related to environment 4. Design and evaluate strategies and methods for sustainable development of environmental systems and for the remediation or restoration of degraded Environments 5. Get awareness on various environmental laws and regulations applicable to global issues and play a role in solving social problems
		CHE116	Engineering Physics Lab	Course Outcomes: By the end of the course, student will be able to: 1. Design and conduct experiments as well as to analyze and interpret data. 2. Apply experimental skills to determine the physical quantities related to Heat, Electromagnetism and Optics.
		CHE117	Programming with C Lab	Course Outcomes: By the end of the course, student will be able to: 1. Gain a working knowledge on programming. 2. Learn and use the fundamentals of a programming language (such as language-defined data types (int, float, char, double), control constructs (sequence, selection, repetition), program modules (including functions, modules, methods). 3. Exhibit the ability to formulate a program that correctly implements the algorithm. 4. Demonstrate the effective use the programming environment used in the course.
		CHE118	Work Shop	Course Outcomes: By the end of the course, student will be able to: 1. Make different carpentry joints. 2. Make simple fitting jobs. 3. Make simple jobs like funnel, elbow etc. using sheet metal. 4. Understand and build circuits for different types of applications like stair case wiring, series and parallel connections.

	I/IV & II Sem.	CHE121	Engineering Mathematics II	Course Outcomes: By the end of the course, student will be able to: 1. Solve linear system equations using of matrix algebra techniques 2. Determine the Eigen values and vectors of a matrix 3. Apply different techniques in solving differential equations that model engineering problem 4. Use the application of Differential equations like simple electric circuits, Newton's law of cooling and to solve any higher order linear ordinary differential equation with constant coefficients 5. Solve linear differential equations and Network analysis using Laplace transforms.
		CHE122	Engineering Chemistry	By end of the course, student will be able to: 1. Identify the problems associated with raw water in various applications and can adopt suitable technologies for domestic and industrial feed waters. 2. Identify & generalize the properties of semiconducting materials and can select suitable semiconducting & various ceramic materials for specific applications. 3. Classify and analyze the conventional energy sources and design of suitable batteries/cells for different engineering applications 4. Select and design of suitable materials to prevent corrosion and protect various parts from corrosion. 5. Implement the green chemistry principles, concept of tribology, unique properties of nano &composite materials in designing of suitable methods and materials to meet the technological challenges. 6. Solve scientific problems related to various engineering fields.
		CHE123	Professional Ethics & Human Values	By end of the course, student will be able to: 1. Understand the right code of conduct from human values 2. Draw inspiration from great personalities and assess his/her roles as a proactive member of the society 3. Understand basics of professional ethics and its implementation for harmony with nature. 4. Solve moral dilemmas and issues 5. Understand and implement Code of ethics of relevant Professional societies and solve global issues
		CHE124	Physical Chemistry	By the end of the course, the student will be able to: 1. Apply the principles of laws of thermodynamics in various Industrial Processes and Designing. 2. Develop suitable conditions in reaction equilibria of various Chemical Processes. 3. Identify the changes in heterogeneous systems and understand the role of various physical quantities useful in Chemical Engineering Industry. 4. Adopt suitable catalytic mechanisms to determine kinetic parameters applicable in Chemical Reaction & Bioprocess Engineering 5. Predict the nature of substances and their behaviour by applying advanced electrochemical laws. 6. Implement the various principles for solving the challenges in the field of Chemical Engineering.
		CHE125	Introduction to Chemical Engineering	By the end of the course, the student will be able to: 1. Appreciate the need and role of a Chemical Engineer in industries. 2. Interpret different units and dimensions and make material and energy balances. 3. Apply the principles involved in momentum, heat and mass transfer. 4. Identify the usage of different equipments for different operations.
		CHE126	Engineering Chemistry Lab	By end of the course, student will be able to: 1. Apply experimental skills in quantitative chemical analysis of water quality parameters, substances and ores. 2. Select and use a suitable instrumental technique for the quantitative estimation and analyse the data obtained.
		CHE127	Language Lab	By the end of the course, student will be able to: 1. Handle CBT (Computer Based Tests) of the qualifying examinations. 2. Receive, interpret, remember and evaluate information by practicing effective listening skills. 3. Speak English with neutralized accent. 4. Narrate, describe and report incidents and situations using appropriate terminology

	II/IV & I Sem.	CHE211	Engineering Mathematics - III	At the end of the course student will be able to: 1. Understand the concepts of Gradient, Divergence and Curl and finding scalar potential function of irrotational vector fields. 2. Understand the concepts of Green's, Stoke's, Divergence theorems and evaluate their related integrals like line, surface, flux. 3. Understand some basic techniques for solving partial differential equations. 4. Apply the knowledge of partial differential equations to various engineering problems. 5. Understand the characteristics, properties of Fourier transforms and gain knowledge in the application of Fourier Transforms.
		CHE212	Organic Chemistry	Course Outcomes: At the end of the course, the student will be able to: 1. Understand the basics of reaction intermediates and polar effects. 2. Design organic molecules in stereo chemical models. 3. Arrive at an idea on mechanism of addition and condensation reactions. 4. Meet the need to understand the industrial preparation of organic compounds at various conditions. 5. Develop further organic applications using synthetic reagents and understand the biological activity of few organic compounds.
		CHE213	Mechanicl Engineering and Strength of Materials	By the end of the course, student will be able to 1. Understand the application of thermodynamic laws. 2. Identify the use of boilers in industries. 3. Classify IC engines and their applications. 4. Evaluate stress-strain analysis 5. Understand the design of thin and thick cylinders.
		CHE214	Basic Electrical & Electronics Engineering	By the end of the course, student will be able to 1. Able to understand the basic concepts of electrical and magnetic circuits and electromagnetic induction. 2. Able to understand the Construction details & Principle of operations of D.C Machines, methods of Excitation, Starting methods of D.C Motor and applications. 3. Able to understand the AC circuit analysis and asses efficiency and regulation of transformer with and without loading. 4. Able to analyzed the performance of Three phase induction motor, and Regulation methods of Alternator, construction of synchronous motors 5. Able to understand the basic concepts of electronic components like diode, zener diode and transistor.
		CHE215	Chemical Process Calculations	By the end of the course, student will be able to 1. Understand and solve basic stoichiometry calculations. 2. Evaluate composition of gases at various temperatures and pressures. 3. Apply material balance on various unit operation and processes. 4. Apply energy balance on various unit operation and processes. 5. Implement the concepts of humidity to humidification and dehumidification processes.
		CHE216	Organic Chemistry Laboratory	At the end of the course, the student will be able to: 1. Synthesize and analyze the properties and nature of the organic compound. 2. Use different types of solvents and reagents in analyzing the functional group of the organic compound.
		CHE217	Mechanicl Engineering Laboratory	At the end of the course, the student will be able to: 1. Measure the physical properties of a given sample. 2. Perform the load test and draw the performance curves.
	II/IV & II Sem.	CHE221	Engineering Mathematics - IV	At the end of the course student will be able to: 1. Understand, interpret and use the basic concepts: analytic function, harmonic function, Taylor and Laurent series, singularity. 2. Familiarize the concepts of Finite Differencesinterpolation techniques. 3. Familiarize the concept and solving of differentiation and integration by numerical methods. 4. Examine, analyze, and compare Probability distributions. 5. Analyze the Statistical data by using statistical tests and to draw valid inferences about the population parameters.

		CHE222	Momentum Transfer	After studying this subject, student will be able to 1. Understand the fluid statics and apply dimensional analysis 2. Apply quantitative laws to fluid flow problems. 3. Analyze the velocity distributions, frictional flow patterns in pipes. 4. Determine the pressure drop, velocities in packed and fluidized bed columns. 5. Analyze the performance aspects of pumps and flow metering devices.
		CHE223	Mechanical Operations	After studying this subject, student wii be able to 1. Identify the size reduction equipment for various samples. 2. Apply the screening techniques for different size separations. 3. Understand and apply the filtration techniques. 4. Predict the different settling regimes. 5. Classify various agitators and conveyors.
		CHE224	Process Instrumentation	After studying this subject, student will be able to 1. Identify the characteristics of various instruments and the instrumentation process. 2. Recognize the relevant from expansion and thermoelectric thermometers. 3. Understand the working and use of various resistance and radiation pyrometers. 4. Apply the various techniques for composition analysis. 5. Interpret the pressure, head and level measuring devices.
		CHE225	Chemical Engineering Thermodynamics - I	By the end of the course, student will be able to 1. Apply first law of thermodynamics to various systems. 2. Predict the PVT behavior using Virial equations. 3. Calculate heat effects on industrial reactions. 4. Apply second law of thermodynamics to various systems. 5. Develop balance equations on various equipments.
		CHE226	Momentum Transfer Laboratory	At the end of the course, the student will be able to: 1. Measure the flow rate by using different flow measuring devices. 2. Draw the characteristic curves of various pumps.
		CHE227	Mechanical Operations Laboratory	At the end of the course, the student will be able to: 1. Measure the average size of a given sample. 2. Operate crushing and grinding equipment. 3. Analyze various separation techniques for a given sample.
	III/IV & I Sem.			
		CHE312	Chemical Engineering Thermodynamics - II	By the end of the course, the student will be able to 1. Understand and apply refrigeration and liquefaction processes. 2. Identify the relations between phases in equilibrium. 3. Understand the concept of fugacity and apply it to non-ideal solutions. 4. Estimate the activity co-efficients. 5. Compute equilibrium constant for a chemical reaction.
		CHE313	Heat Transfer	By the end of the course, the student will be able to: 1. Implement the basic laws of conduction to steady state and unsteady state problems. 2. Predict convective heat transfer coefficients at various conditions. 3. Compute heat loss / gain due to radiation. 4. Classify various heat transfer equipments. 5. Determine the performance of different Evaporators.
		CHE314	Mass Transfer - I	By the end of the course, the student will be able to: 1. Estimate the flux of molecules and diffusivity of gases, liquids and solids 2. Predict the mass transfer coefficients and know its importance 3. Design an absorption column 4. Generate VLE data and estimate the number of stages for a distillation column 5. Identify the equipment for different gas-liquid operations.
		CHE315	Chemical Reaction Engineering - I	By the end of the course, the student will be able to: 1. Predict various mechanisms for various reactions. 2. Analyse batch reactor data by various methods 3. Design various ideal reactors 4. Design various combinations of reactor systems 5. Quantify product distribution for multiple reactions
		CHE316	Elective - I (Polymer Technology)	By the end of the course, the student will be able to 1. Classify polymers and determine molecular weight of a polymer. 2. Identify the kinetics of polymerization and importance of their properties. 3. Summarize the methods of polymerization. 4. Understand the principles and working of processing equipment. 5. Select the manufacturing process for a polymer compound.

		CHE316	Elective - I (Fertilizer Technology)	At the end of the course, the student will be able to: 1. Classify the raw materials for fertilizer production and their importance. 2. Identify manufacturing processes of nitrogenous fertilizers. 3. Describe the production of N, P, K fertilizers. 4. Apply the knowledge of design of reactors for the manufacturing processes. 5. Acquaint with various methods of storage and handling of fertilizers.
		CHE317	Heat Transfer Laboratory	At the completion of the course, the student will be able to 1. Determine the heat transfer coefficients. 2. Operate various heat transfer equipments.
		CHE318	Soft Skills Laboratory	By the end of the course, the studentwill be able to: 1 Comprehend the core engineering subjects using effective verbal and nonverbal communication skills. 2 Present accurate and relevant information efficiently, using suitable material aids. 3 Work effectively as an individual as well in teams and emerge as responsible leaders with appropriate professional ethics. 4 Participate in group discussions and interviews using analytical and problem solving abilities, which enhance their employability skills. 5 Set time bound goals and realize them through strategic plans for successful career.
	III/IV & II Sem.	CHE321	Mass Transfer - II	By the end of the course, the student will be able to 1. Plot Ternary liquid equilibrium and process design of extractors. 2. Classify different leaching equipments and compute material balance. 3. Understand adsorption isotherms and evaluate the processdesign aspects of adsorption column. 4. Estimate total time for drying operation and understand different types of drying equipment. 5. Identify the importance of crystallization and membrane separation processes.
		CHE322	Chemical Reaction Engineering - II	By the end of the course, the student will be able to: 1. Analyze the temperature and pressure effects of chemical reactions 2. Distinguish between ideal and non-ideal reactors 3. Characterize the catalyst by knowing their properties 4. Design solid-catalyst reactors 5. Formulate the mechanisms for solid-fluid and fluid-fluid reactions
		CHE323	Material Science and Engineering	By the end of the course, the student will be able to 1. Identify and depict the crystal structure and their properties based on the structure. 2. Quantify the imperfections in a crystal. 3. Analyse the mechanical properties of engineering materials, draw the stress – strain diagrams. 4. Classify composite materials and their importance in engineering design and determine the type of fracture mechanism. 5. Outline heat treatment process to obtain required mechanical properties for a given alloy.
		CHE324	Chemical Technology	By the end of the course, the student will be able to: 1. Outline the manufacturing of sulphur and nitrogen product industries. 2. Describe the manufacturing of phosphoric acid, chloro-alkali and cement industries. 3. Understand the manufacture of coal chemicals and petroleum products. 4. Acquire the knowledge on extraction of vegetable oils and manufacture of paints and varnishes. 5. Describe the manufacture of pulp, cane sugar and polymerization products
		CHE325	Elective - II (Petrochemicals)	By the end of the course, the student will be able to 1. Understand petrochemical industry feedstocks, various chemicals produced from methane. 2. Describe the production of different chemicals from C2 carbon atoms 3. Outline the production of different chemicals from C3, C4 and higher carbon atoms and production of various polymers. 4. Acquire the knowledge on production of petroleum aromatics 5. Describe the production of different intermediate chemicals, synthetic fibres, rubber and synthetic detergents.

		CHE325	Elective - II (Industrial Pollution and control)	By the end of the course, the student will be able to: 1. Understand the various types of pollution and their effects on man and environment. 2. Analyze the sources and meteorological aspects of air pollution. 3. Comprehend the sampling and control methods of air pollution. 4. Understand the sampling and control methods of water pollution. 5. Acquire knowledge on management of solid and hazardous wastes.
		CHE326	Mass Transfer Laboratory	By the end of the course, the student will be able to, 1. Determine the diffusion an mass transfer coefficient. 2. Operate the various distillation equipments. 3. Evaluate the performance of mass transfer operations.
		CHE327	Chemical Reaction Engineering Laboratory	By the end of the course, the student will be able to 1. Determine the kinetics of a chemical reaction in various reactors 2. Acquire hands on experience on the operation of various ideal and non-ideal reactors
		CHE328	Chemical Technology Laboratory	By the end of the course, the student will be able to 1. Analyze water and other compounds 2. Prepare different industrial products on laboratory scale
	IV/IV & I Sem.			
		CHE412	Transport Phenomena	By the end of the course, the student would be able to: 1. Determine the dependency of transport properties on pressure and temperature. 2. Identify the coordinates and develop velocity, temperature and concentration profiles in laminar flow. 3. Apply equations of change for non-isothermal systems for solving steady state problems. 4. Evaluate velocity distributions using time smoothed quantities. 5. Estimate the friction factors, heat transfer coefficients and mass transfer coefficients
		CHE413	Process Dynamics and Control	By the end of the course, the student will be able to: 1. Formulate and solve linear chemical processes 2. Develop block diagram and transfer function for a closed loop system. 3. Analyze stability of control systems 4. Analyze the response of processes for various controllers 5. Acquire the knowledge on advanced control strategies, controller tuning and control valves.
		CHE414	Process Modeling and Simulation	1.Apply the fundamental laws to develop a mathematical model for simple flow systems. 2.Formulate mathematical models for various types of reactors 3.Develop a mathematical model for various Mass transfer equipment. 4.Solve the mathematical models using numerical methods. 5.Simulate mathematical models for various operations.
		CHE415 (A)	Elective - III- Petroleum Refinery Engineering	By the end of the course, the student will be able to: 1. Formulate and solve linear chemical processes 2. Develop block diagram and transfer function for a closed loop system. 3. Analyze stability of control systems 4. Analyze the response of processes for various controllers 5. Acquire the knowledge on advanced control strategies, controller tuning and control valves.
		CHE 415(C)	Elective - III: Nanotechnology	By the end of the course, the student will be able to: 1. Understand the basics of nanotechnology 2. Classify different classes of nanomaterials. 3. Apply nanotechnology to chemical and its related industries 4. Process Design different synthesis route of nanomaterials 5. Apply chemical reaction engineering concepts for production of different nanomaterials
		CHE416	Process Dynamics and Control Laboratory	By the end of the course, the student will be able to: 1. Outline the formation of crude oil and its reserves 2. Acquire knowledge on pretreatment and fractionation of petroleum 3. Predict the suitable treatment techniques for the desired products 4. Classify various petroleum cracking operations 5. Identify different refinery value addition processes

		CHE417	Process Modeling and Simulation Laboratory	By the end of the course, the student will be able to: 1.Represent the process in terms of mathematical equations. 2.Acquire hands on experience on simulation packages and tools.
		CHE418	Project Seminar	By the end of the course, the student will be able to: 1. Prepare Technical Reports 2. Develop Presentation and Communication Skills
		CHE419	Industrial Tranining	By the end of the course, the student would be able to 1. Practically analyze various unit operations and processes in a chemical industry. 2. Prepare a technical report
	IV/IV & II Sem.	CHE421	Chemical Process Economics and Equipment Design	By the end of the course, the student would be able to 1 Outline the general design considerations for design / expansion of the process. 2 Estimate the time value of money and depreciation 3 Compute the cost of an equipment and process plant 4 Evaluate mechanical design of equipment. 5 Design process equipment
		CHE422 (B)	Elective - IV- Process Optimization	By the end of the course, student will be able to: 1. Apply the knowledge of optimization to formulate the problems 2. Apply different methods of optimization and to suggest a technique for specific problem with a single variable 3. Apply different methods of optimization and to suggest a technique for specific problem with multivariable. 4. Apply of simplex method for linear optimization problems 5.Understand how optimization can be used to solve the industrial problems of relevance to the chemical industry
		CHE423	Chemical Process Equipment Design Laboratory	By the end of the course, the student would be able to 1 Design heat transfer equipment 2 Design reactor and mass transfer equipment
		CHE424	Project	By the end of the course, student will be able to: 1. Identify the gap between the needs of society and available technology through literature survey 2. Formulate and analyze the objectives of their study 3. Aggregate research in the form of a written report

COURSE OBJECTIVES AND COURSE OUTCOMES (R19 Regulation)				
Dept	**Year & Semester**	**Course Code**	**Course Name**	**Course Outcomes**
Chemical Engineering	**I/IV & I Sem.**	CHE111	Engineering Mathematics – I	By the end of the semester, the student will be able to: 1. Apply elementary transformations to reduce the matrix into the echelon form and normal form to determine its rank and interpret the various solutions of system of linear equations. 2. Identify the special properties of a matrix such as the eigen value, eigen vector, employ orthogonal transformations to express the matrix into diagonal form, quadratic form and canonical form. 3. Equip themselves familiar with the functions of several variables and mean value theorems. 4. Evaluatedoubleandtripleintegralstechniquesoveraregionintwodimensionalandthree dimensional geometry. 5. Familiarize with special functions to evaluate some proper and improper integrals using beta and gamma functions
		CHE112	Engineering Physics	By the end of the course the students will be able to 1. Interpret the relation between heat, work and entropy with thermodynamic laws. 2. Explain and analyze the relation between electric current and magnetic fields, production and applications of ultrasonics. 3. Apply the optical phenomena like Interference, Diffraction and Polarization to various fields. 4. Explain the working principle and applications of lasers and fiber optics. 5. Interpret the microscopic behavior of matter with quantum mechanics.

		CHE113	Engineering Chemistry	By the end of the semester, the student will be able to: 1. Identify the problems associated with raw water in various applications and can adopt suitable technologies for domestic and industrial feed waters. 2. Understand the concepts of electro chemistry for design of suitable batteries and solar energy in view of environmental protection. 3. Select and design of suitable materials to prevent corrosion and to protect various parts from corrosion. 4. Generalize the properties of semiconducting and ceramic materials, can select suitable materials for specific applications. 5. Analyze the importance of nano, composite and smart materials.
		CHE114	Introduction to Chemical Engineering	By the end of the course, student will be able to: 1. Apply the basic Principles of Chemical Engineering in industries. 2. Apply the principles involved in Momentum Transfer. 3. Apply the principles involved in Heat Transfer. 4. Apply the principles of diffusion, absorption, distillation involved in Mass Transfer. 5. Apply the principles of extraction, drying involved in Mass Transfer.
		CHE115	Engineering Drawing	By the end of the course, the student will be able to: 1. Draw conic sections by different methods and construct cycloidal and involute curves. 2. Project orthographically the points and lines in various positions. 3. Produce orthographic projections of plane surfaces. 4. Draw orthographic projections of solids in various orientations. 5. Construct isometric views and isometric projections of simple solids.
		CHE116	Engineering Physics Lab	At the end of this course, the students will be able to: 1. Design and conduct experiments as well as to analyze and interpet data. 2. Apply experimental skills to determine the physical quantities related to heat, electromagnetism and optics .
		CHE117	Engineering Chemistry Lab	At the end of this course, the students will be able to: 1.Apply experimental skills in analysing samples through titration procedures . 2. Select and use a suitable instrumental technique for the quantitative analysis for more accuracy.
		CHE118	Engineering Workshop	By the end of the course, student will be able to: 1. Make different carpentry joints. 2. Make simple fitting jobs. 3. Make simple jobs like funnel, elbow etc. using sheet metal. 4. Understand and build circuits for different types of applications like stair case wiring, godown wiring. 5. Make simple circuits on bread board using soldering kit
		CHE119	Human Values and Professional Ethics (Mandatory non-credit course)	By the end of the semester, the student will be able to: 1. Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field. 2. Identify the multiple ethical interests at stake in a real-world situation or practice. 3. Articulate what makes a particular course of action ethically defensible. 4. Assess their own ethical values and the social context of problems. 5. Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human. 6. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.
	I/IV & II Sem.	CHE121	Engineering Mathematics – II	By the end of the semester, the student will be able to: 1. Demonstrate solutions to first order differential equations by various methods and solve basic application problem related to electrical circuits, orthogonal trajectors and Newton‘s law of cooling. 2. Discriminate among the structure and procedure of solving a higher order differential equations with constant coefficients and variable coefficients. 3. Apply various numerical methods to solve linear and non-linear equations. 4. Familiar with numerical integration and differentiation. 5. Understand Laplace transforms and its properties and finding the solution of ordinary differential equations.
		CHE122	Communicative English	By the end of the course, the student will be able to: 1. Comprehend, interpret and analyze text and answer questions based on passages. 2. Demonstrate good writing skills for effective paraphrasing, argumentative essays and formal correspondence. 3. Construct grammatically correct sentences and apply proper vocabulary in speech and writing.

	CHE123	Physical and Analytical Chemistry	By the end of the semester, the student will be able to: 1. Apply the Homgeneous and heterogeneous Chemical equilibria laws in various systems and Develop Optimum conditions for these systems in Industrial Processes. 2. Familarizein the concepts of surface characterisation by using X-Ray difraction and stabilization of colloids and nanomaterials. 3. Get Knowledge on the Quantitative determination of various samples either by using Titrimetry or gravimetry with least error. 4. Get adept in Computing pH, Potential and conductance by electro analytical methods. 5. Separate impurities by Applying Solvent extraction and Gas chromotagraphy Techniques.
	CHE124	Basic Electrical and Electronics Engineering	After completion of the course the student will be able to: 1. Understand the behavior of PN diode under different biasing conditions. 2. Calculate the efficiency and ripple factor of half wave, Full wave center tapped and Bridge . 3. Obtain input and output characteristics of BJT in different configurations and identify the region of operation of transistor. 4. Design the transistor biasing and compensation circuits for better stability. 5. Device the characteristics of FET/MOSFET in different modes.
	CHE125	Problem solving with C	After completion of this course, a student will be able to: 1. Gain knowledge in problem solving and steps in Program development. 2. Apply the basic concepts of C . 3. Implement different operations on arrays and string to solve any given problem. 4. Demonstrate pointers and modularization. 5. Apply structures and unions and Implement file Operations in C programming for any given application .
	CHE126	English Language Lab	By the end of the course, the student will be able to: 1. Speak English with proper pronunciation and intonation. 2. Make effective oral presentations by interpreting and analysing data, pictures and videos and participate in Group Discussion on general topics. 3. Make meaningful conversations and follow logical flow of thought; answer questions on key concepts after listening to extended passages.
	CHE127	Problem solving with C Lab	After completion of this course, a student will be able to: 1. Develop C programs using operators. 2. Write C programs using conditional structures. 3. Write C programs using iterative structure arrays and strings. 4. Inscribe C programs that use Pointers toand functions. 5. Develop a c program for implementing user defined types and file processing.
	CHE128	Environmental Science (Mandatory non-credit course)	By the end of the semester, the student will be able to: 1. Identify the characteristics of various natural resources and can implement the conservation practices. 2. Realize the importance of Ecosystem and Biodiversity for maintaining ecological balance. 3. Classify, analyze various pollutants and can develop methods for solving problems related to environment. 4. Get awareness on various environmental laws and methods for sustainable development of environment. 5. Understand the impact of population growth on human health and environment.
II/IV & I Sem.	CHE211	Engineering Mathematics – III	By the end of the course, student will be able to 1. Explain the characteristics of scalar and vector valued functions and provide a physical interpretation of the gradient, divergence, curl and related concepts. 2. transform line integral to surface integral, surface to volume integral and vice versa using Green's theorem, Stoke's theorem and Gauss's divergence theorem. 3. Explain analytical methods for solving PDEs like applying Separation of Variables to solve elementary problems in linear second order Partial Differential Equations (heat and wave equations). 4. Understand the need for a function or its approximation as an infinite Fourier series to represent discontinuous function which occurs in signal processing and electrical circuits. 5. Find different Fourier transforms of non-periodic functions and also use them to evaluate boundary value problems.
	CHE212	Organic Chemistry	By the end of the course, student will be able to 1. Understand the basics of reaction intermediates and polar effects. 2. Design organic molecules in stereo chemical models 3. Arrive at an idea on mechanism of addition and condensation reactions. 4. Meet the need to understand the industrial preparation of organic compounds at various conditions. 5. Develop further organic applications using synthetic reagents and understand the biological activity of few organic compounds.

	CHE213	Basic Mechanical Engineering	By the end of the course, student will be able to 1. Understand the physical significance of thermodynamic laws. 2. Classify IC engines and their applications. 3. Identify the use of boilers in industries. 4. Evaluate stress-strain analysis 5. Understand the design of thin and thick cylinders.
	CHE214	Chemical Process Calculations	By the end of the course, student will be able to 1. Solve basic stoichiometry calculations. 2. Evaluate composition of gases at various temperatures and pressures. 3. Apply material balance on various unit operation and processes. 4. Apply energy balance on various unit operation and processes. 5. Implement the concepts of humidity to humidification and dehumidification processes.
	CHE215	Mechanical Operations	By the end of the course, student will be able to 1. Identify the size reduction equipment for various size reduction operations. 2. Apply the screening techniques for different size separations. 3. Analyze the filtration techniques for various filtration operations. 4. Apply the principles of settling in classification of solids. 5. Calculate the power consumption for various mixing operations and identify mixers for cohesive and non cohesive solids.
	CHE216	Organic Chemistry Lab	1.Synthesize and analyze the properties and nature of the organic compound. 2. Use different types of solvents and reagents in analyzing the functional group of the organic compound.
	CHE217	Mechanical Operations Lab	By the end of the course, student will be able to 1. Calculate the average size of a given sample. 2. Operate crushing and grinding equipment. 3. Apply various separation techniques for a given sample.
II/IV & II Sem.	CHE221	Engineering Mathematics – IV	By the end of the course, student will be able to 1. Analyze limit, continuity and differentiation of functions of complex variables and Understand Cauchy-Riemann equations, analytic functions and various properties of analytic functions. 2. Understand Cauchy theorem and Cauchy integral formulas and apply these to valuate complex contour integrals and represent functions as Taylor and Laurent series and determine their intervals of convergence. 3. Be familiar with numerical solution of ordinary differential equations. 4. Examine, analyze and compare Probability distributions. 5. Analyze the Statistical data by using statistical tests and to draw valid inferences about the population parameters.
	CHE222	Biology for Engineers	By the end of the course, student will be able to 1. Summarize the basis of life, classify organisms, and compare prokaryote and eukaryote cells. 2. Outline the chemical nature and functions of various Biomolecules. 3. Infer the applications of enzymes and fermentation in industries. 4. Illustrate the basic principles of heredity, cell division and gene expression. 5. Implement engineering principles to biological systems to build better solutions to mankind.
	CHE223	Momentum Transfer	By the end of the course, student will be able to 1. Apply the basic principles of static to fluid systems. 2. Apply quantitative laws to hydrostatic and fluid flow problems. 3. Analyze the velocity distributions, frictional flow patterns in pipes and piping networks. 4. Determine the pressure drop, velocities in packed and fluidized bed columns. 5. Analyze the performance aspects of fluid machinery specifically for pumps and flow metering devices.
	CHE224	Chemical Engineering Thermodynamics – I	By the end of the course, student will be able to 1. Apply first law of thermodynamics to various systems. 2. Predict the PVT behavior using Virial equations. 3. Calculate heat effects on industrial reactions. 4. Apply second law of thermodynamics to various systems. 5. Develop balance equations on various equipments.
	CHE225	Numerical Methods for Chemical Engineers	By the end of the course, student will be able to 1. Implement Root finding methods for solution on non-linear algebraic equations. 2. Use Interpolation and regression methods to chemical engineering problems. 3. Apply Numerical differentiation and Integration to solve problems. 4. Solve system of linear algebraic equations by Numerical methods. 5. Solve chemical engineering problems involve PDE.
	CHE226	Professional Elective - I (Polymer Technology)	By the end of the course, student will be able to 1. Classify polymers and determine the molecular weight of a polymer. 2. Interpret the kinetics of polymerization, glass transition temperature and impact of various properties on degradation of polymer. 3. Illustrate methods of polymerization, role of specific promoters/agents on polymerization. 4. Demonstrate various processing equipments used for polymer products. 5. Select suitable manufacturing process for a polymer compound.

	CHE226	Professional Elective - I (Design Thinking)	By the end of the course, student will be able to 1. Identify the real problem. 2. Identify the constraints for producing a solution. 3. Design a robust approach for the problem. 4. Develop a viable solution. 5. Evaluate the problem, procedure and solution.
	CHE227	Momentum Transfer Lab	By the end of the course, student will be able to 1. Measure the flow rate and pressure drops by using different flow measuring devices. 2. Draw the characteristic curves for various pumps.
	CHE228	Computational Lab	By the end of the course, student will be able to 1. Identify the suitable algorithm to solve chemical engineering problems. 2. Demonstrate their programming skills to solve numerical problems