



The Kavery Engineering College

(Approved by AICTE, New Delhi & Affiliated to Anna University)
Mecheri, Mettur Tk. Salem Dt - 636 453.

DEPARTMENT OF CHEMICAL ENGINEERING

PROGRAMME: B.TECH. CHEMICAL ENGINEERING

VISION

- ❖ To be a centre of excellence for development and dissemination of knowledge in Chemical Engineering for the nation.

MISSION

- ❖ To impart knowledge to students at all levels through a vibrant, dynamic and state of art intellectual delivery to ensure the creation of a complete Chemical Engineer with a high sense of social responsibility and professional ethics.
- ❖ Synergize the efforts of the students and faculty to evolve innovative Engineering practices and teaching methodologies

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- ❖ To inculcate conceptual knowledge in the fields of Chemical Engineering.
- ❖ To impart problem solving, analytical skills in the contemporary processes.
- ❖ To expedite state of art laboratory facility to offer practical Knowledge.
- ❖ To design and develop eco-friendly sustainable technologies with the aid of computational skills
- ❖ To facilitate the ability to learn, innovate and communicate technical developments for the benefit of humanity
- ❖ To disseminate the knowledge related to intellectual property ownership rights, ethics, professionalism, entrepreneurship, and their societal impact.

PROGRAM OUTCOMES (POs)

- ❖ Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ❖ Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- ❖ Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.



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- ❖ Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- ❖ Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- ❖ The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- ❖ Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- ❖ Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- ❖ Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- ❖ Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- ❖ Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- ❖ Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- ❖ Graduates will have a strong foundation in engineering, science and current Chemical Engineering practices and will have experience in solving structured and unstructured problems using conventional and innovative solutions.
- ❖ Graduates will be able to effectively describe the Chemical Engineering problem, analyze the data, develop potential solutions, evaluate these solutions, and present the results using their oral, written and electronic media skills.



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- ❖ Graduates will have an understanding of ethical and professional responsibilities of an engineer and the impact of engineering solutions on society and the global environment.

COURSE OUTCOMES (COs)

Regulation	2021
Sem	01
Subject Code	HS3151
Subject Name	PROFESSIONAL ENGLISH - I
Course Outcome	At the end of the course, learners will be able CO1 : To listen and comprehend complex academic texts CO2 : To read and infer the denotative and connotative meanings of technical texts CO3 : To write definitions, descriptions, narrations and essays on various topics CO4 : To speak fluently and accurately in formal and informal communicative contexts CO5 : To express their opinions effectively in both oral and written medium of communication

Regulation	2021
Sem	01
Subject Code	MA3151
Subject Name	MATRICES AND CALCULUS
Course Outcome	At the end of the course the students will be able to CO1 : Use the matrix algebra methods for solving practical problems. CO2 : Apply differential calculus tools in solving various application problems. CO3 : Able to use differential calculus ideas on several variable functions. CO4 : Apply different methods of integration in solving practical problems. CO5 : Apply multiple integral ideas in solving areas, volumes and other practical problems.



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Regulation	2021
Sem	01
Subject Code	PH3151
Subject Name	ENGINEERING PHYSICS
Course Outcome	After completion of this course, the students should be able to CO1 : Understand the importance of mechanics. CO2 : Express their knowledge in electromagnetic waves. CO3 : Demonstrate a strong foundational knowledge in oscillations, optics and lasers. CO4 : Understand the importance of quantum physics. CO5 : Comprehend and apply quantum mechanical principles towards the formation of energy bands.

Regulation	2021
Sem	01
Subject Code	CY3151
Subject Name	ENGINEERING CHEMISTRY
Course Outcome	At the end of the course, the students will be able: CO1: To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water. CO2: To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications. CO3: To apply the knowledge of phase rule and composites for material selection requirements. CO4: To recommend suitable fuels for engineering processes and applications. CO5: To recognize different forms of energy resources and apply them for suitable applications in energy sectors.

Regulation	2021
Sem	01
Subject Code	GE3151
Subject Name	PROBLEM SOLVING AND PYTHON PROGRAMMING
Course Outcome	Upon completion of the course, students will be able to CO1: Develop algorithmic solutions to simple computational problems. CO2: Develop and execute simple Python programs. CO3: Write simple Python programs using conditionals and looping for solving problems. CO4: Decompose a Python program into functions.



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	<p>CO5: Represent compound data using Python lists, tuples, dictionaries etc.</p> <p>CO6: Read and write data from/to files in Python programs.</p>
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Regulation	2021
Sem	01
Subject Code	GE3171
Subject Name	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
Course Outcome	<p>On completion of the course, students will be able to:</p> <p>CO1: Develop algorithmic solutions to simple computational problems</p> <p>CO2: Develop and execute simple Python programs.</p> <p>CO3: Implement programs in Python using conditionals and loops for solving problems..</p> <p>CO4: Deploy functions to decompose a Python program.</p> <p>CO5: Process compound data using Python data structures.</p> <p>CO6: Utilize Python packages in developing software applications.</p>

Regulation	2021
Sem	01
Subject Code	BS3171
Subject Name	PHYSICS AND CHEMISTRY LABORATORY
Course Outcome	<p>PHYSICS LABORATORY</p> <p>Upon completion of the course, the students should be able to</p> <p>CO1: Understand the functioning of various physics laboratory equipment.</p> <p>CO2: Use graphical models to analyze laboratory data.</p> <p>CO3 : Use mathematical models as a medium for quantitative reasoning and describing physical reality.</p> <p>CO4: Access, process and analyze scientific information.</p> <p>CO5: Solve problems individually and collaboratively.</p> <p>CHEMISTRY LABORATORY</p> <p>To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.</p> <ul style="list-style-type: none"> • To determine the amount of metal ions through volumetric and spectroscopic techniques • To analyse and determine the composition of alloys. • To learn simple method of synthesis of nanoparticles • To quantitatively analyse the impurities in solution by electro analytical techniques



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Regulation	2021
Sem	02
Subject Code	HS3251
Subject Name	PROFESSIONAL ENGLISH - II
Course Outcome	At the end of the course, learners will be able CO1 : To compare and contrast products and ideas in technical texts. CO2 : To identify cause and effects in events, industrial processes through technical texts CO3 : To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. CO4 : To report events and the processes of technical and industrial nature. CO5 : To present their opinions in a planned and logical manner, and draft effective resumes in context of job search.

Regulation	2021
Sem	02
Subject Code	MA3251
Subject Name	STATISTICS AND NUMERICAL METHODS
Course Outcome	Upon successful completion of the course, students will be able to: <ul style="list-style-type: none">• Apply the concept of testing of hypothesis for small and large samples in real life problems.• Apply the basic concepts of classifications of design of experiments in the field of agriculture.• Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.• Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.• Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.



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Regulation	2021
Sem	02
Subject Code	PH3258
Subject Name	PHYSICS OF MATERIALS
Course Outcome	On completion of the course, the students should be able to CO1 : acquire knowledge of phase diagram, and thin film and nanomaterial preparation techniques CO2 : familiarize with conducting materials, basic quantum mechanics, and properties and applications of superconductors. CO3 : gain knowledge on semiconducting materials based on energy level diagrams, its types, temperature effect. Also, fabrication methods for semiconductor devices will be understood. CO4 : realize with theories and applications of dielectric and ferromagnetic materials CO5 : familiarize with ceramics, composites, metallic glasses, shape memory alloys, biomaterials and their important applications.

Regulation	2021
Sem	02
Subject Code	BE3252
Subject Name	BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING
Course Outcome	After completing this course, the students will be able to CO1: Compute the electric circuit parameters for simple problems CO2: Explain the concepts of domestic wiring and protective devices CO3: Explain the working principle and applications of electrical machines CO4: Analyze the characteristics of analog electronic devices CO5: Explain the types and operating principles of sensors and transducers

Regulation	2021
Sem	02
Subject Code	GE3251
Subject Name	ENGINEERING GRAPHICS
Course Outcome	On successful completion of this course, the student will be able to • Use BIS conventions and specifications for engineering drawing. • Construct the conic curves, involutes and cycloid. • Solve practical problems involving projection of lines.



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	<ul style="list-style-type: none">• Draw the orthographic, isometric and perspective projections of simple solids.• Draw the development of simple solids.
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Regulation	2021
Sem	02
Subject Code	CH3251
Subject Name	INTRODUCTION TO CHEMICAL ENGINEERING
Course Outcome	Upon successful completion of the course, student should be able to: CO1. Correlate day to day like with the principles of chemical Engineering. CO2. Assess the mass and energy involved in any chemical plant. CO3. Have an insight into arears where Chemical Engineering plays major role. CO4. Carry out modelling and simulation using software tools. CO5. Identify their right future. CO6: Gain confidence and outline about the programme as a whole.

Regulation	2021
Sem	02
Subject Code	GE3271
Subject Name	ENGINEERING PRACTICES LABORATORY
Course Outcome	Upon completion of this course, the students will be able to: <ul style="list-style-type: none">• Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.• Wire various electrical joints in common household electrical wire work.• Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.• Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.



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Regulation	2021
Sem	02
Subject Code	BE3272
Subject Name	BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY
Course Outcome	After completing this course, the students will be able to CO1: Use experimental methods to verify the Ohm's law and Kirchhoff's Law and to measure three phase power CO2: Analyze experimentally the load characteristics of electrical machines CO3: Analyze the characteristics of basic electronic devices CO4: Use LVDT to measure displacement

Regulation	2021
Sem	03
Subject Code	MA3356
Subject Name	Differential Equations
Course Outcome	<ul style="list-style-type: none">• Apply various methods of solving differential equation which arise in many application problems.• Understand how to solve the given standard partial differential equations.• Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.• Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.• Familiar with various methods to solve time dependent partial differential equations.

Regulation	2021
Sem	03
Subject Code	CH3301
Subject Name	Basic Mechanical Engineering
Course Outcome	<ul style="list-style-type: none">• Students should learn thermodynamics and thermal engineering to understand the principles behind the operation of thermal equipments like IC engines and turbines etc., Students should be able to appreciate the theory behind operation of machinery and be able to design simple



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	mechanisms.
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Regulation	2021
Sem	03
Subject Code	CH3302
Subject Name	Mechanics of Solids
Course Outcome	<ul style="list-style-type: none">Solve the problems related to the structural components under various loading conditions

Regulation	2021
Sem	03
Subject Code	CH3351
Subject Name	Chemical Process Calculations
Course Outcome	<ul style="list-style-type: none">Understand the fundamentals of units and stoichiometric equations.Write material balance for different chemical process.Understand the fundamentals of ideal gas behavior and phase equilibria. Write energy balance for different chemical process.

Regulation	2021
Sem	03
Subject Code	CH3352
Subject Name	Fluid Mechanics for Chemical Engineers
Course Outcome	<ul style="list-style-type: none">Understand the fundamental properties of fluids and its characteristics under static conditions.Develop empirical correlation using dimensionless analysis.Analyze flow of fluid through pipe and over the of solid, Understand and select flow meter(s), characteristics of pumps used in Chemical Process Industries

Regulation	2021
Sem	03
Subject Code	CH3303
Subject Name	Chemical Process Industries



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Course Outcome	<ul style="list-style-type: none">At the end of this course, the student can classify the chemical process industry into industrial categories of base, intermediate end-products and specialty chemicals manufacturers.
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Regulation	2021
Sem	03
Subject Code	CH3311
Subject Name	Basic Mechanical Engineering Laboratory
Course Outcome	CO1: Determine Brake power, Indicated power and frictional power of single cylinder diesel engines. CO2: Determine Brake power, Indicated power and frictional power of twin cylinder diesel engines. CO3: Determine Brake power, Indicated power and frictional power of single cylinder petrol engines. CO4: Evaluate the heat distribution from engine and preparing heat balance chart. CO5: Estimate the engine performance with mechanical loading CO6: Estimate the PTD and VTD of two and four stroke engines

Regulation	2021
Sem	03
Subject Code	CH3312
Subject Name	Technical Analysis Laboratory
Course Outcome	<ul style="list-style-type: none">Familiarization with equipment like viscometers, flash and fire point apparatus etcFamiliarization of methods for determining CODFamiliarization of a few simple synthetic techniques for soap

Regulation	2021
Sem	03
Subject Code	GE33361
Subject Name	Professional Development\$



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Course Outcome	<ul style="list-style-type: none">• Apply sound principles of teaching, learning, advocacy and reflection• Exhibit effective techniques which promote learning for all students regardless of race, culture, gender, age, creed or ability.• Display professionalism and ownership of professional growth and learning.• Extend collaboration to students, colleagues and the community.
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Regulation	2021
Sem	04
Subject Code	MA3451
Subject Name	Transform Techniques
Course Outcome	<ul style="list-style-type: none">• Calculate grad, div and curl and use Gauss, Stokes and Greens theorems to simplify calculations of integrals.• Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.• Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.• Understand the mathematical principles on Laplace transforms and would provide them the ability to formulate and solve some of the physical problems of engineering.• Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

Regulation	2021
Sem	04
Subject Code	CH3451
Subject Name	Mass Transfer I
Course Outcome	CO1: Understand the fundamentals, types and mechanism of mass transfer operations CO2: Understand the theories of mass transfer and the concept of inter-phase mass transfer CO3: Understand the basics of humidification process and its application CO4: Understand the concept and mechanism of drying operations



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	CO5: Understand the concept of crystallization process and identification of suitable crystallizer CO6: Formulate and solve material balances for unit operations such as humidification, drying and crystallization operations.
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Regulation	2021
Sem	04
Subject Code	PC3352
Subject Name	Mechanical Operations
Course Outcome	<ul style="list-style-type: none"> At the end of this course, the students will be able to understand the overview of equipment used to perform various mechanical operations and problems associated during the implementation and applications.

Regulation	2021
Sem	04
Subject Code	CH3401
Subject Name	Chemical Engineering Thermodynamics – I
Course Outcome	CO1: Understand the fundamental concepts of thermodynamics and its related functions CO2: Relate PVT behaviour of fluids and understand the real gas behavior CO3: Apply second law and analyse the feasibility of system/devices CO4: Analyse the thermodynamic property relations and their application to fluid flow CO5: Develop the significance of thermodynamic potentials and their use in the analysis of processes CO6: Formulate thermodynamic formulations and the working of compressors and expanders

Regulation	2021
Sem	04
Subject Code	CH3491
Subject Name	Heat Transfer
Course Outcome	CO1: To familiarize the students with the fundamental concepts of Heat Transfer. Provide the student with knowledge about heat transfer by conduction in solids for steady state CO2: Students will understand convective heat transfer and use of heat transfer coefficients for laminar and turbulent flows



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	<p>CO3: The course gives the student insight about boundary layer flow, laminar and turbulent flows</p> <p>CO4: Students will be able to calculate and use overall heat transfer coefficients in designing heat exchangers</p> <p>CO5: The course provides the student with knowledge about heat transfer with phase change (Boiling and condensation) and evaporation</p> <p>CO6: Students will understand radiative heat transfer including blackbody radiation and Kirchoff's law, and will be able to solve radiative problems apply knowledge of heat transfer to solve thermal engineering problems</p>
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Regulation	2021
Sem	04
Subject Code	GE3451
Subject Name	Environmental Sciences and Sustainability
Course Outcome	<ul style="list-style-type: none"> • Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course. • Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in std. of living has lead to serious environmental disasters.

Regulation	2021
Sem	04
Subject Code	CH3411
Subject Name	Fluid Mechanics Laboratory
Course Outcome	<ul style="list-style-type: none"> • Use variable area flow meters and variable head flow meters • Analyze the flow of fluids through closed conduits, open channels and flow past immersed bodies • Select pumps for the transportation of fluids based on process conditions/requirements and fluid properties

Regulation	2021
Sem	04
Subject Code	CH3412
Subject Name	Mechanical Operations Laboratory



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Course Outcome	CO1: Determine the size analysis in solid- solid separation systems CO2: Capability to select different solid - fluid separation equipments. CO3: Evaluate the size reduction and various crushing parameters CO4: Estimate the separation characteristics CO5: Understand the technical methods related to unit operations in process plant CO6: Apply and understand fluid particle systems and equipment
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Regulation	2021
Sem	04
Subject Code	CH3513
Subject Name	Industrial Training/Internship I*
Course Outcome	<ul style="list-style-type: none">• Gain Valuable work experience.• Explore a career path.• Give yourself an edge in the job market.• Develop and refine skills.