



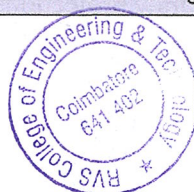
RVS COLLEGE OF ENGINEERING AND TECHNOLOGY
Kumaran Kottam Campus, Kannampalayam (PO), Coimbatore – 641 402
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
NAAC Accredited and ISO 21001:2018 certified Institution
DEPARTMENT OF PETROCHEMICAL ENGINEERING



Regulation – 2017

Course ID	Semester	Course Code	Course Name	Course Outcome	Course Outcome
C101	I	HS8151	Communicative English	CO1	Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
				CO2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
				CO3	Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation.
				CO4	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
				CO5	To present oneself confidently and compete with the corporate world.
C102	I	MA8151	Engineering Mathematics–I	CO1	Determine the Eigen values and vectors of a matrix.
				CO2	Apply the concept of univariate calculus to support their subsequent engineering studies.
				CO3	Apply the standard calculus computations on parametric and polar curves
				CO4	Estimate the maxima and minima of the multi variable functions.
				CO5	Evaluate multiple integrals and apply them to find area bounded by plane curves and volume bounded by closed surfaces.
C103	I	PH8151	Engineering	CO1	Extend the knowledge about the crystal structures and crystal growth

Dr. R.KANNAN, A.M.I.E., M.Tech., Ph.D.,
 Professor & Head
 Department of Petrochemical Engineering
 RVS College of Engineering and Technology
 Sulur, Coimbatore - 641 402.

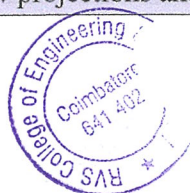


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			Physics		techniques.
				CO2	Interpret the fundamental knowledge about the elastic nature of materials and able to differentiate a good thermal conductor from the bad thermal conductor.
				CO3	Apply the knowledge of quantum mechanics and classical mechanics in addressing problems related to science and technology.
				CO4	Utilize the knowledge about designing an auditorium with good acoustical properties and make use of ultrasonic and its applications in various fields.
				CO5	Identify and appreciate the advantages of optical communication using LASER.
C104	I	CY8151	Engineering Chemistry	CO1	The knowledge gained on polymer chemistry to apply various polymers in oil industries.
				CO2	Can gain the knowledge on thermodynamics to understand the concepts on these subjects for further learning.
				CO3	Ability to apply photochemistry and spectroscopy for oil analysis
				CO4	Ability to get knowledge about importance of alloying and phase rule
				CO5	Can gain the knowledge on nano chemistry to understand the concepts on these subjects for further learning.
C105	I	GE8151	Problem Solving and Python Programming	CO1	Develop algorithmic solutions to simple computational problems
				CO2	Read, write, execute by simple Python programs.
				CO3	Structure simple Python programs for solving problems. Decompose a Python program into functions.
				CO4	Represent compound data using Python lists, tuples and dictionaries.
				CO5	Read and write data from/to files in Python Programs.
C106	I	GE8152	Engineering Graphics	CO1	Familiarize with the fundamentals and standards of Engineering graphics
				CO2	Perform freehand sketching of basic geometrical constructions and multiple views of objects.
				CO3	Project orthographic projections of lines and plane surfaces
				CO4	Draw projections and solids and development of surfaces.

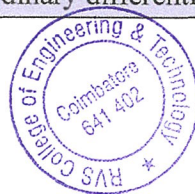
Dr. R.KANNAN, A.M.I.E., M.Tech., Ph.D.,
 Professor & Head
 Department of Petrochemical Engineering
 RVS College of Engineering and Technology
 Sulur, Coimbatore - 641 402



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				CO5	The student will be able to Visualize and to project isometric and perspective sections of simple solids.
C107	I	GE8161	Problem Solving and Python Programming Laboratory	CO1	Inscribe, test, and debug simple Python programs.
				CO2	Execute Python programs with conditionals and loops.
				CO3	Expand Python programs stepwise by defining functions and calling them.
				CO4	Employ Python lists, tuples, and dictionaries for representing compound data.
				CO5	Interpret and write data from/to files in Python.
C108	I	BS8161	Physics and Chemistry Laboratory	CO1	Decide the young's modulus and rigidity modulus using the principle of elasticity.
				CO2	Compute the acoustical parameters, optical measurements using laser and energy band gap of semiconductors.
				CO3	Conclude the water quality parameters like hardness, alkalinity and dissolved oxygen.
				CO4	Approximate the amount acid by pH metric and conductometric method.
				CO5	Appreciate the concept of redox reaction through potentiometric titration.
C109	II	HS8251	Technical English	CO1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies.
				CO2	Involving in telling stories and interpreting articles and passages. Produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
				CO3	Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation.
				CO4	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
				CO5	To expatiate with self-reliance to the global community and to get involved in industrialism globalized market.
C110	II	MA8251	Engineering Mathematics-II	CO1	Apply knowledge of vector calculus in engineering disciplines
				CO2	Solve ordinary differential equations that model the engineering problems

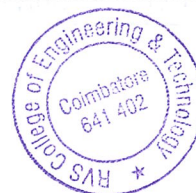
Dr. R.KANNAN, A.M.I.E., M.Tech., Ph.D.,
 Professor & Head
 Department of Petrochemical Engineering
 RVS College of Engineering and Technology
 Sular, Coimbatore - 641 402.



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				CO3	Find the Laplace transform of functions and solve the ordinary differential equations using Laplace transform
				CO4	Construct analytic functions and apply the knowledge of conformal mappings in engineering disciplines
				CO5	Evaluate contour integration and apply it in engineering problems
C111	II	PH8254	Physics of Materials	CO1	Describe the conducting materials and their properties.
				CO2	Analyze the semiconductors and able to differentiate various types of semiconductors.
				CO3	Apply the knowledge of magnetic and super conducting materials for modern day to day applications.
				CO4	Explain the properties and applications of dielectrics.
				CO5	Apply the knowledge about the modern engineering materials for various applications.
C112	II	CY8291	Organic Chemistry	CO1	To enable the students to learn the type of components in which organic reactions take place and also to know the preparation of the essential organic compounds.
				CO2	Students able to understand the function and application of different types of carbohydrates and proteins.
				CO3	To educate the students with fundamental scientific and basic principles of petrochemical products.
				CO4	Students able to understand the function, structure and application of different types of amino acids and proteins.
				CO5	At the end of the course students will have knowledge on various reaction mechanism, preparation of various organic compounds and their properties
C113	II	BE8256	Basic Mechanical Engineering	CO1	Understand the various laws of thermodynamics
				CO2	Impart knowledge about the thermodynamic process
				CO3	Learn about the thermodynamic cycles
				CO4	Gain knowledge about I.C. Engines, Steam And Its Properties
				CO5	Able to appreciate the theory behind operation of machinery and be able to

Dr. R.KANNAN, A.M.I.E., M.Tech., Ph.D.,
 Professor & Head
 Department of Petrochemical Engineering
 RVS College of Engineering and Technology
 Suler, Coimbatore - 641 402.



Principal
 RVS College of Engineering & Technology
 Coimbatore - 641 402

					design simple mechanisms
C114	II	PM8251	Industrial Chemical Technology	CO1	Explain The Specified Production Of Chemicals (Sulphur, H ₂ SO ₄ , Cement) With Operating Conditions
				CO2	Choose The Appropriate Technology Needed For The Production Of Industrial Inorganic Chemicals.
				CO3	Elaborate The Various Methods Of Production For Paper, Sugar And Starch Based Industries.
				CO4	Perceive The Operating Methods Of Petroleum And Petrochemical Plants.
				CO5	Discuss About The Specified Production Of Rubbers, Polymers And Fibers.
C115	II	CY8281	Organic Chemistry Laboratory	CO1	Able to identify what distinguishes a strong & weak nucleophile.
				CO2	Able to recall the rules of reaction.
				CO3	Able to show mastery of nomenclature since ethyl bromide is not drawn out.
				CO4	Able to analyzes a list of compounds and determines their reactivity.
				CO5	Able to determine the derivatives present in the mixture.
C116	II	GE8261	Engineering Practices Laboratory	CO1	Construct carpentry components and pipe connections including plumbing works.
				CO2	Use welding equipment's to join the structures
				CO3	Illustrate the basic machining operations
				CO4	Construct the models using sheet metal works
				CO5	Describe centrifugal pump, Air conditioner, operations of smithy, foundry and fittings.
C201	III	MA8391	Probability and Statistics	CO1	Express the variance of random variable.
				CO2	Calculate the expected value of a function of random variables.
				CO3	Formulate the distribution functions
				CO4	Define the discrete distribution and solve the problem about the distribution
				CO5	Define the continuous distribution and solve the problem about the distribution
C202	III	GE8292	Engineering	CO1	Understanding the basic concept of mechanics and predict the effect of force

Dr. R.KANNAN, A.M.I.E. M.Tech., Ph.D.,
Professor & Head
Department of Petrochemical Engineering
RVS College of Engineering and Technology
Sulur, Coimbatore - 641 402.



Rajesh
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Coimbatore - 641 402

			Mechanics		and motion
				CO2	Impart knowledge about the free body diagram, vectorial representation of moments and couples and Equilibrium of Rigid bodies in two and three dimensions
				CO3	To study about the mass and area moment of inertia for varying sections by using standard theorem
				CO4	To know the relation between displacements, velocity and acceleration
				CO5	Explain the concept of different types of friction and general plain motions
C203	III	PM8351	Fluid Mechanics	CO1	Comprehend the types of fluids and fluid motion.
				CO2	Apply the basic equation for pressure measurement and differential analysis of fluid motion.
				CO3	Show the relation among the variables by using dimensional analysis.
				CO4	Analyze flow behavior of fluids flow in internal, external and the through solids.
				CO5	Select and perform the fluid moving machinery and flow meters for different applications in process industries.
C204	III	PM8391	Materials Technology	CO1	Analyze The Types, Classification, Defects And Structural Diffraction Examination Methods Of Materials.
				CO2	Evaluate The Various Phase Diagrams, Mechanical Testing Methods, Failure Types And Strengthening Methods Of Engineering Materials.
				CO3	Understand Steels, Heat Treatment Of Steels, Cast Iron And Its Properties, Alloys Of Cu, Ni, Al & Ti.
				CO4	Demonstrate Theory And Uses Of Electrical Conductivity And Magnetism In Material Structure Context.
				CO5	Apply The Knowledge About Non-Metallic Materials In Design And Selection.
C205	III	CH8351	Process Calculations	CO1	Apply the fundamentals of units, concept of ideal gas behavior in gas calculations
				CO2	Interpret stoichiometric principles to write the material balance for unit

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 Professor & Head
 Department of Petrochemical Engineering
 RVS College of Engineering and Technology
 Sulur, Coimbatore - 641 402.



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					operations with chemical reaction and without chemical reaction
				CO3	Develop a design equation for condensation and drying using the humidity calculations technique
				CO4	Solve the energy balance problems for the system with or without chemical reaction
				CO5	Discuss about the Orsat technique for flue gas analysis & Excess air calculation and adapt simulation technique for process calculations
C206	III	EE8352	Principles of Electrical and Electronics Engineering	CO1	Explain the working of measuring instruments and solve the basic dc and ac circuits.
				CO2	Describe the operation of dc generators, motors, single phase induction motors and transformers.
				CO3	Clarify the working of basic electronic devices such as diode, transistor and rectifier.
				CO4	Demonstrate operation of digital devices such as logic gates, counters, flip-flops analog to digital converts and digital to analog converters.
				CO5	Justify the knowledge on working of communication systems such as radio, radar, fax and television
C207	III	EE8361	Electrical Engineering Laboratory	CO1	Investigate the voltage drop due to armature reaction effect in DC shunt and DC compound generators and Design Ampere turns for Inter poles and compensating.
				CO2	Analyze load characteristics DC shunt, series and compound motor. Examine its maximum output and maximum efficiency
				CO3	Investigate the constant losses of the DC shunt motor predict the efficiency in different methods at different load condition
				CO4	Analyze load characteristics of single and three phase transformers. Examine the different losses and efficiency
				CO5	Investigate the equivalent circuit parameters of single-phase transformer to predetermine its voltage regulation and efficiency.
C208	III	ME8362	Mechanical Engineering	CO1	Students will be able to understand Power-generating engines
				CO2	Students will be able to understand Power-generating operating IC engines

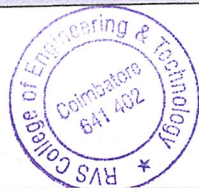
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			Laboratory	CO3	Students will be able to understand and conduct tests on IC engines
				CO4	Able to appreciate the theory behind the functioning of engines
				CO5	Understand the Material properties, their behavior under different kinds of loading and testing can be visualized.
C209	IV	PE8491	Chemical Engineering Thermodynamics	CO1	Students will be able to understand the Basic concepts of Thermodynamics and basic terminology in thermodynamics
				CO2	Students will be able to understand and determine changes in the properties of gases, fluids and solids undergoing changes in temperature, pressure and volume.
				CO3	To understand the concept on first law and second law of thermodynamics and its applications
				CO4	To learn the knowledge on thermodynamics potentials and thermodynamics diagram.
				CO5	To understand the concept on compression fluids and application on power plant and engine.
C210	IV	PM8451	Petroleum Exploration and Exploitation Techniques	CO1	Apply geological and geophysical methods for the evaluation of subsurface formations, and apply basic statistical principles in the development of geological model
				CO2	Apply the knowledge of seismic data acquisition, processing and procedure for interpretation and pattern recognition for interpretation of seismic data for the understanding of stratigraphy and seismic facies analysis
				CO3	Provide essential knowledge and expertise of the main petroleum geosciences subject areas (e.g. reservoir characterization, geophysical imaging and interpretation, geochemistry, well site and operations geology, formation evaluation, petroleum economics, risk analysis, reservoir engineering, etc.) The integration of these specialist subject areas to provide a complete interpretation is emphasized during the course.
				CO4	Effectively describe petroleum well drilling and completion principles, including key features of various components, and use these descriptions in appropriate for design, design analysis and evaluations;

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				CO5	Get exposed to different geological and geophysical methods for exploration and exploitation of oil and gas
C211	IV	CY8292	Chemistry for Technologists	CO1	The knowledge gained on unit process to apply various industries as petroleum, drugs, pharmaceuticals and organic synthesis.
				CO2	Can gain the knowledge on reaction mechanism to understand the concepts on these subjects for further learning.
				CO3	Ability to Chemical analysis of oils and fats
				CO4	Ability to get knowledge about importance of sodium hypochlorite, hydrogen peroxide, chlorine dioxide
				CO5	Can gain the knowledge on Theory of color and constitution to understand the concepts on these subjects for further learning.
C212	IV	PE8092	Natural Gas Engineering	CO1	To know the source and formation of natural gas.
				CO2	To gain knowledge in pretreatment and processing of natural gas.
				CO3	An ability to know gas compression Techniques.
				CO4	Students will be able to understand flow strategy.
				CO5	Students will be able to monitor well deliverability tests.
C213	IV	CH8451	Mechanical Operations	CO1	To gain engineering knowledge on particle size, shape and its characteristics including various methods of screen analysis, equipments and its effectiveness.
				CO2	To educate the students about various laws of crushing and suitable design equipments.
				CO3	To score engineering knowledge on settling characteristics, its types and design of continuous thickeners using batch sedimentation.
				CO4	To be conversant with types of filtration, design of various filtration equipments and optimums cycle of operation.
				CO5	To make the students understand the importance of mixing and agitation of different mixtures, storage and transportation of solids.
C214	IV	PM8452	Petroleum Primary Processing	CO1	Students will gain knowledge about types of exploration and exploitation techniques of crude.
				CO2	Ability to test petroleum products to find out their specifications and

Dr. R.KANNAN, A.M.I.E., M.Tech., Ph.D.,
 Professor & Head
 Department of Petrochemical Engineering
 RVS College of Engineering and Technology
 Sulur, Coimbatore - 641 402.




 PRINCIPAL
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			Technology		significance.
				CO3	Students attaining knowledge in pre-treatment techniques involved in the crude processing
				CO4	Students obtaining sound knowledge about the treatment techniques of lube distillate for the production of lubricating oils.
				CO5	Students will acquire knowledge about bitumen processing and their final treatment techniques.
C215	IV	PE8461	Fluids and Solid Operations Laboratory	CO1	To learn experimentally to calibrate the various flow meters,
				CO2	To learn experimentally to find the pressure loss for fluid flows
				CO3	To learn and determine the pump characteristics.
				CO4	Students develop working knowledge on different types of crushing equipments
				CO5	Ability to gain separation characteristics of different mechanical operation separators.
C216	IV	CH8281	Chemical Analysis Laboratory	CO1	Determine the quantity and quality of water, soap and Oil
				CO2	Analyze or Check the properties like flash and fire point, cloud and pour point, aniline point of petroleum products
				CO3	Demonstrate their knowledge to analyze the cement
				CO4	Identify, and analyze the coal & petrochemical products
				CO5	Work on the process of determination of water quality testing methods
C301	V	CH8591	Heat Transfer	CO1	To learn about heat conduction, Thermal conductivity measurement
				CO2	To understand Concepts of heat transfer by convection.
				CO3	To learn Heat transfer to boiling liquids & condensing vapors.
				CO4	To understand theory & methods of evaporation. To understand concepts & laws of radiation.
				CO5	To learn about design of heat exchanger.
C302	V	CH8551	Mass Transfer I	CO1	Understand the terminology associated with diffusion mass transfer and can calculate mass transfer rates under various conditions.
				CO2	Students attaining knowledge in interphase mass transfer concepts and

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 Department of Petrochemical Engineering
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 Suler, Coimbatore - 641 402.




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					ability to design interphase mass transfer equipments.
				CO3	Students obtaining sound knowledge about humidification mechanisms and applying the mass transfer concepts in the design of humidification equipments such as cooling tower.
				CO4	Students will acquire knowledge about drying operation and applying mass transfer concepts to design drying equipments.
				CO5	Students obtaining sound knowledge about crystallization mechanisms and applying the mass transfer concepts in the design of crystallizers.
C303	V	PE8091	Chemical Reaction Engineering	CO1	To enable the students to gain knowledge on different types of chemical reactors
				CO2	To enable the students to gain knowledge on design of chemical reactors under isothermal conditions
				CO3	To enable the students to gain knowledge on Design of reactors for multiple reactions
				CO4	To enable the students to gain knowledge on design of chemical reactors under non-isothermal conditions
				CO5	To enable the students to gain knowledge residence time functions and relationship between them in reactor
C304	V	HS8581	Professional Communication	CO1	Participate enthusiastically in formal conversations in order to improve speaking skills in English
				CO2	Write Resume, Letters and Emails to improve the writing skills effectively in English
				CO3	Prepare and Practice Questions and Answers for National and International level examination
				CO4	Participate effectively in order to improve interview skills in English for career purpose
				CO5	To improve creative, critical thinking, and follow stress management and time management for career purpose
C305 PE1	V	PM8078	Professional Elective I	CO1	Discuss and elaborate knowledge of chemical concepts relevant to petrochemical processes.

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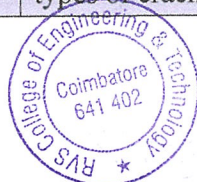

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			Petrochemical Unit Processes	CO2	Interpret the importance of main hydrocarbon functional subgroups identified and fundamental differences described in relation to petrochemical processes.
				CO3	List Composition of crude oil and basic petroleum products. Short description of petroleum products for energy use and characteristics of non-fuel products, Standards and specifications.
				CO4	Justify the principles of assessing of energetic efficiency of the process and rules of evaluation of the feasibility of process revamping.
				CO5	Evaluate the sequence, process operations for optimum performance of a petrochemical process system
C306 OE1	V	ORO551	Open Elective I Renewable Energy Sources	CO1	To get exposure on solar radiation and its environmental impact to power
				CO2	To know about the various collectors used for storing solar energy.
				CO3	To know about the various applications in solar energy.
				CO4	To learn about the wind energy and biomass and its economic aspects.
				CO5	To know about geothermal energy with other energy sources.
C307	V	CH8561	Heat Transfer Laboratory	CO1	Students will impart knowledge on the Heat Transfer for the design
				CO2	Analyzing the Heat Transfer Rates in Various Equipment
				CO3	Develop a working and Design knowledge on cooling tower process.
				CO4	Understanding heat transfer phenomena in boiling.
				CO5	Understanding fundamental principles of conduction, convection, radiation in various equipments.
C308	V	PM8561	Petrochemical Analysis Laboratory	CO1	Students will impart knowledge on the determination of imperative data for the design and operation of various properties of fuels.
				CO2	Analyzing physical behavior of various gases and liquids.
				CO3	Understanding and analyzing of testing operations to design various testing process.
				CO4	Evaluating characteristics of various fuels.
				CO5	Understanding fundamental working of physical properties of fuels.
C309	VI	PM8651	Petroleum Secondary	CO1	Gain knowledge about the secondary processing of petroleum and various types of cracking and coking mechanism.

Dr. R.KANNAN, A.M.I.E., M.Tech., Ph.D.,

Professor & Head

Department of Petrochemical Engineering
RVS College of Engineering and Technology
Coimbatore - 641 402



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			Processing Technology	CO2	Understand the knowledge about various catalytic cracking and hydro cracking techniques.
				CO3	Attain knowledge about the theory, reaction conditions and catalyst for catalytic reforming.
				CO4	Obtain sound knowledge about the significance of Alkylation and Isomerisation process.
				CO5	Acquire knowledge about specialty products such as industrial grease, liquid paraffin and petroleum jellys
C310	VI	CH8651	Mass Transfer II	CO1	Apply fundamental knowledge about absorption to design better column to improve separation in process industry.
				CO2	Design a distillation column for the process requirements and apply the knowledge to select the better distillation column to increase the separation efficiency.
				CO3	Utilize various extraction equipments and adapt skills to design industrial extraction equipment to reduce the waste.
				CO4	Make use of Leaching for solid-liquid operation to produce better yield to achieve the process requirements.
				CO5	Apply the principles and concepts of adsorption for the recovery process, and also attain technical knowledge about Ion-exchange and Membrane Separation process to solve societal problems.
C311	VI	PE8072	Catalytic Reaction Engineering	CO1	Gain the knowledge on catalyst and its characterization
				CO2	Ability to get knowledge about kinetics of heterogeneous catalytic reactions
				CO3	Gain the knowledge on transport processes with reactions catalyzed by solids
				CO4	Gain knowledge on catalyst deactivation kinetics of catalyst poisoning
				CO5	Ability to know about the chemical analysis of industrial catalytic processes
C312	VI	GE8076	Professional Ethics in Engineering	CO1	Gain knowledge about the human values.
				CO2	Obtain sound knowledge about the Engineering ethics, theories and uses.
				CO3	Know about the engineering as social experimentation and codes of ethics.
				CO4	Understand the safety, risk, responsibilities and rights.

Dr. R.KANNAN, A.M.T.E., M.Tech., Ph.D.,

Professor & Head

Department of Petrochemical Engineering
RVS College of Engineering and Technology
Sulur, Coimbatore - 641 402.



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Coimbatore - 641 402

				CO5	Acquire knowledge about global issues, code of conduct, leadership and social responsibilities.
C313	VI	CH8653	Process Instrumentation, Dynamics and Control	CO1	Choose the appropriate process instruments and adapt the technical knowledge to handle all kind of instruments in process industries
				CO2	Distinguish to control the various parameters in the process plant at the desired level.
				CO3	Predict and maintain the stability of the system.
				CO4	Apply the knowledge to monitor the process for all time intervals and its response
				CO5	Perceive the overall process with the advanced control system
C314 PE2	VI	PE8071	Professional Elective II Advanced Separation Techniques	CO1	Identify various conventional and modern separation techniques in chemical engineering processes
				CO2	Describe the fundamentals of membrane separation and charged based separation techniques
				CO3	Analyze conventional and advanced extraction and filtration systems
				CO4	Apply the knowledge of surface and ionic properties in the separation process
				CO5	Analyze and design different membrane modules, chromatographic and ion exchange systems for intended applications
C315	VI	CH8781	Mass Transfer Laboratory	CO1	Demonstrate the experiment with industrial distillation columns for the process requirements.
				CO2	Analyzing diffusion behavior of gases, liquids and solids in industrial important mass transfer operations.
				CO3	Make use of industrial extraction operations and choose the best among the available method for the process requirements.
				CO4	Select the appropriate equipment for drying operation for industrial needs.
				CO5	Adapt the basic principles of gas-liquid absorption in the operation of an absorption column and cooling towers for industrial purpose.
C316	VI	PE8661	Petroleum	CO1	Learn the amount of particulates of different fuels in emission properties.

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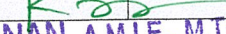
			Testing Laboratory	CO2	Knowing the physical and chemical properties of fuel which reduces the exhaust emission and play a great role in combustion process
				CO3	Gain the knowledge about existence of crude which replaces the alternative greener fuel for sustainable environment.
				CO4	Gain the knowledge of Protect our assets with quality testing and maintenance recommendations from standard fuel testing methods
				CO5	Analysis the fuel for avoidance of corrosion occurrence by environment conditions
C401	VII	PM8751	Process Equipment Design and Drawing	CO1	Integrate the knowledge acquired in evaluating thermodynamic properties for equipment design
				CO2	Develop understanding of process design development and general design considerations. Prepare process flow sheets for design showing reactors, distillation columns, and other process equipment.
				CO3	Conduct preliminary feasibility study of the plant design assigned in evaporator.
				CO4	Design heat exchanging equipment's such double pipe heat exchanger, shell and tube heat exchanger, plate heat exchanger, condenser, single and multiple effect evaporators and drier based on standards by TEMA, IS codes etc.
				CO5	Can do the mechanical design and process for fan and pump and it's their performance.
C402	VII	GE8291	Environmental Science and Engineering	CO1	To obtain knowledge about environment, ecosystems and biodiversity.
				CO2	To take control measures of environmental pollution.
				CO3	To gain knowledge about natural resources and energy sources.
				CO4	To find and implement scientific, technological, economic and political solutions to environmental problems
				CO5	To understand the impact of environment on human population.
C403 PE3	VII	PE8073	Professional Elective III	CO1	To impart knowledge on fundamentals of enhanced oil recovery
				CO2	Ability to get knowledge about water flooding and predictive techniques

Dr. R.KANNAN, A.M.I.E., M.Tech., Ph.D.,
 Professor & Head
 Department of Petrochemical Engineering
 RVS College of Engineering and Technology
 Suler, Coimbatore - 641 402.




 PRINCIPAL
 RVS College of Engineering & Technology
 Coimbatore - 641 402

			Enhanced Oil Recovery	CO3	To impart knowledge on how residual oil is recovered
				CO4	To impart knowledge on how in-situ combustion technology, microbial method
				CO5	To impart knowledge on problems associated with enhanced oil recovery.
C404 PE4	VII	PM8081	Professional Elective IV Refinery Process Design	CO1	Analyze the fundamentals of multi-component distillation and its design
				CO2	An ability to evaluate overall energy requirements in distillation column, and design of distillation column.
				CO3	Apply the knowledge of distillation column design and its design parameter requirements, mechanical column design and control of column by P&ID controller.
				CO4	Analyze the fired heaters uses in crude refining and its types, an ability to design fired heaters.
				CO5	Examine the selection criteria for pumps and compressor calculations.
C405 PE5	VII	PM8077	Professional Elective V Petrochemical Derivatives	CO1	Gain knowledge about the various chemicals produced from petrochemical precursors.
				CO2	Understand the various chemicals produced from first generation petrochemicals.
				CO3	Understand the various chemicals produced from second generation petrochemicals.
				CO4	Understand the various chemicals produced from third generation petrochemicals.
				CO5	Understand the various chemicals produced from fourth generation petrochemicals.
C406 OE2	VII	OME754	Open Elective II Industrial Safety	CO1	Gain knowledge about the modern safety procedures, fire preventions and mechanical hazards.
				CO2	Understand about the various chemical hazards, toxic materials and industrial hygiene.
				CO3	Attain knowledge about industrial health hazards, industrial noise, noise measuring devices and use of personnel protection equipments.
				CO4	Obtain knowledge about the hazard analysis, techniques, effects and risk


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 Sullur, Coimbatore - 641 402.




PRINCIPAL
 RVS College of Engineering & Technology
 Coimbatore - 641 402

			Welding Technology		and arc welding process.
				CO2	Understand the construction and working principles of resistance welding process.
				CO3	Understand the construction and working principles of various solid-state welding processes.
				CO4	Understand the construction and working principles of various special welding processes.
				CO5	Understand the concepts on weld joint design, weld ability and testing of weldments.
C411	VIII	PM8811	Project Work	CO1	Apply sound technical knowledge and interpersonal skills in the selected project topic.
				CO2	Compare the features of technology available in the literature and adapt suitable technology to formulate and solve the problem
				CO3	Develop a systematic approach to complex problem solving and design required equipments to execute the Project work
				CO4	Defend the features of completed project with proper justification and interpret the concept of professional ethics in the work
				CO5	Create novel ideas & techniques to debottleneck the challenging problems in a co ordination with team effort
C412	VIII	PM8812	Seminar	CO1	Demonstrate the ability to perform close and critical readings.
				CO2	Demonstrate the ability to distinguish opinions and beliefs from research to claims.
				CO3	Demonstrate the ability to evaluate credit and synthesize sources.
				CO4	Demonstrate the ability to proof read
				CO5	Ability to speak and debate with appreciation for complex social and cultural sensibilities.


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PRINCIPAL
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 Coimbatore - 641 402

					analysis.
				CO5	Acquire knowledge about safety regulations, disaster management, hazard control and factories act.
C407	VII	PM8761	Reaction Engineering and Process Control Laboratory	CO1	Develop the rate equation for different types of reactors.
				CO2	Design experiments in kinetics to determine conversion and effect of temperature on rate constant.
				CO3	Assess the performance of Plug flow Mixed flow and Packed bed by studying the residence time distribution.
				CO4	Understand the prerequisites of control strategies and design different process control systems
				CO5	Evaluate the suitable controllers for different chemical & Petrochemical process.
C408	VIII	PM8711	Internship	CO1	Develop work habits and attitude necessary for job success.
				CO2	Integrate theory and practice.
				CO3	Build a record of work experience.
				CO4	Learned to appreciate work and its function in the economy.
				CO5	Develop communication; inter personnel and other critical skills in the job interview processes.
C409 PE6	VIII	PE8093	Professional Elective VI Plant Safety and Risk Analysis	CO1	Gain knowledge about the various industrial hazards like chemical, physical, mechanical, ergonomics, biological and noise hazards.
				CO2	Understand the techniques behind the hazard identification and its control.
				CO3	Attain knowledge about the risk analysis, disaster management and risk management.
				CO4	Obtain knowledge about the safety in plant design and layout, various industry act and laws.
				CO5	Acquire knowledge about safety measures in handling and storage of chemicals.
C410	VIII	PM8801	Pipeline and	CO1	Understand the construction and working principles of gas

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[Signature]
 PRINCIPAL
 RVS College of Engineering & Technology
 Coimbatore - 641 402