

**PRIST**  
DEEMED TO BE  
**UNIVERSITY**  
NAAC ACCREDITED  
THANJAVUR – 613 403 - TAMIL NADU

**SCHOOL OF ENGINEERING AND TECHNOLOGY**  
**DEPARTMENT OF MECHANICAL ENGINEERING**

**PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

- I. Effectuating success in careers by exploring with the design, digital and computational analysis of engineering systems, experimentation and testing, smart manufacturing, technical services, and research.
- II. Amalgamating effectively with stakeholders to update and improve their core competencies and abilities to ethically compete in the ever-changing multicultural global enterprise.
- III. To encourage multi-disciplinary research and development to foster advanced technology, and to nurture innovation and entrepreneurship in order to compete successfully in the global economy.
- IV. To globally share and apply technical knowledge to create new opportunities that proactively advances our society through team efforts and to solve various challenging technical, environmental and societal problems.
- V. To create world class mechanical engineers capable of practice engineering ethically with a solid vision to become great leaders in academia, industries and society.

**PROGRAM OUTCOMES (POs)**

PO	GRADUATE ATTRIBUTE
1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	<b>Design/development of solutions:</b> 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.
4	<b>Conduct investigations of complex problems:</b> 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.
5	<b>Modern tool usage:</b> 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.
6	<b>The engineer and society:</b> 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.

  
HOD

Department of Mechanical Engineering  
Ponnalyah Ramalayam Institute of  
Science & Technology (PRIST)  
(Institution Deemed to be University  
is 3 of the UGC Act 1956)  
Thanjavur - 613 403, TAMIL NADU.



DEAN  
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Varam, Thanjavur-613,4, N.

- 7 **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.
- 8 **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9 **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10 **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.
- 11 **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.
- 12 **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)


On successful completion of the Mechanical Engineering Degree programme, the Graduates shall exhibit the following:

1. Apply the knowledge gained in Mechanical Engineering for design and development and manufacture of engineering systems.
2. Apply the knowledge acquired to investigate research-oriented problems in mechanical engineering with due consideration for environmental and social impacts.
3. Use the engineering analysis and data management tools for effective management of multidisciplinary projects.

### PEO / PO MAPPING:

PEOs	POs												PSOs			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
I.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
II.	3	2	2	2	2	1	1	1	3		2	1	2	3	3	3
III.	3	1	2	1	2	2	1		1	2		3	3	2	2	2
IV.	2	2	2	2	2		2				1	2	2	3	3	3
V.	3	2	2	2	1	3	2	2	2	1	1	3	3	2	2	2

  
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**DEAN**  
 School of Engineering and Tech.  
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 Vallam, Thanjavur-613.



## PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY (PRIST)

Declared as DEEMED-TO-BE-UNIVERSITY  
U/s 3 of UGC Act, 1956

### DEPARTMENT OF MECHNANICAL ENGINEERING B.TECH - FULL TIME (UG-2021)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES	PO												PSO		
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
21147S11	PROFESSIONAL ENGLISH - I	To use appropriate words in a professional context	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
		To gain understanding of basic grammatical structures and use them in right context.	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
		To read and infer the denotative and connotative meanings of technical texts	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
		To read and interpret information presented in tables, charts and other graphic forms	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
		To write definitions, descriptions, narrations and essays on various topics	2	3	3	3	-	3	3	3	2	3	-	3	-	-	-
		<b>AVg.</b>	1. 6	2 .2	1. 8	2 .2	1 .5	3	3	3	1 6	3	3	3	3	-	-
21148S12	MATRICES AND CALCULUS	Use the matrix algebra methods for solving practical problems.	3	3	1	1	0	0	0	0	2	0	2	3	-	-	-



		To apply the knowledge of phase rule and composites for material selection requirements.	3	1	-	-	-	-	-	-	-	-	-	-	-	-
		To recommend suitable fuels for engineering processes and applications.	3	1	1	-	-	1	2	-	-	-	-	-	-	-
		To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	3	1	2	1	-	2	2	-	-	-	-	2	-	-
		<b>Avg.</b>	2. 8	1 3	1. 6	1	-	1 5	1 8	-	-	-	-	1. 5	-	-
21150S15	<b>PROBLEM SOLVING AND PYTHON PROGRAMMING</b>	Develop algorithmic solutions to simple computational problems	3	3	3	3	2	-	-	-	-	-	2	2	3	3
		Develop and execute simple Python programs.	3	3	3	3	2	-	-	-	-	-	2	2	3	-
		Write simple Python programs using conditionals and looping for solving problems.	3	3	3	3	2	-	-	-	-	-	2	-	3	-
		Decompose a Python program into functions	2	2	-	2	2	-	-	-	-	-	1	-	3	-
		Represent compound data using Python lists, tuples, dictionaries etc	1	2	-	-	1	-	-	-	-	-	1	-	2	-
		<b>AVg.</b>	2	2	-	-	2	-	-	-	-	-	1	-	2	-
21150L16	<b>PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY</b>	On completion of the course, students will be able to:	3	3	3	3	3	-	-	-	-	-	3	2	3	3
		Develop algorithmic solutions to simple computational problems Develop and execute simple Python programs.	3	3	3	3	3	-	-	-	-	-	3	2	3	-
		Implement programs in Python using conditionals and loops for solving problems.	3	3	3	3	2	-	-	-	-	-	2	-	3	-



		To describe products and processes and explain their uses and purposes clearly and accurately	3	3	3	3	1	3	3	3	3	3	3	3	-	-		
		To express their opinions effectively in both formal and informal discussions	3	3	3	3	1	3	3	3	3	3	3	3	-	-		
		<b>AVg.</b>	3	3	3	3	1	3	3	3	3	3	3	3	-	-		
21147S21	PROFESSIONAL ENGLISH - II	To compare and contrast products and ideas in technical texts.	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-	
		To identify and report cause and effects in events, industrial processes through technical texts	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-	
		To analyse problems in order to arrive at feasible solutions and communicate them in the written format.	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-	
		To present their ideas and opinions in a planned and logical manner	3	3	3	3	2	3	3	3	2	3	3	3	-	-	-	
		To draft effective resumes in the context of job search.	-	-	-	-	-	-	-	-	-	3	3	3	3	-	-	-
		<b>AVg.</b>	3	3	3	3	2 7 5	3	3	3	2 2	3	3	3	3	-	-	-
21148S22	STATISTICS AND NUMERICAL METHODS	Apply the concept of testing of hypothesis for small and large samples in real life problems.	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-	
		Apply the basic concepts of classifications of design of experiments in the field of agriculture.	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-	
		Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-	
		Understand the knowledge of various techniques and methods for solving first and second order ordinary differential	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-	

		equations.																
		Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-	
		<b>Avg</b>	3	3	1	1	1	0	0	0	2	0	2	3	-	-	-	
21149S23 D	MATERIALS SCIENCE	know basics of crystallography and its importance for varied materials properties	3	2	1	2	1	1	-	-	-	-	-	-	-	-	-	
		gain knowledge on the electrical and magnetic properties of materials and their applications	3	2	1	1	2	1	1	-	-	-	-	-	-	-	-	
		understand clearly of semiconductor physics and functioning of semiconductor devices	3	2	2	2	2	1	-	-	-	-	-	-	-	-	-	
		understand the optical properties of materials and working principles of various optical devices	3	2	2	1	2	2	-	-	-	-	-	-	1	-	-	
		appreciate the importance of functional nanoelectronic devices.	3	2	2	1	2	1	-	-	-	-	-	-	-	-	-	
		<b>AVG</b>	3	2	1. 6	1 .4	1 .8	1 .2	1	-	-	-	-	-	1	-	-	
21153S25 A	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	Compute the electric circuit parameters for simple problems	2	2	1					1				2			1	
		Explain the working principle and applications of electrical machines	2	2	1					1				2			1	
		Analyze the characteristics of analog electronic devices	2	1	1					1				2			1	
		Explain the basic concepts of digital electronics	2	2	1					1				2			1	



		Explain the operating principles of measuring instruments	2	2	1					1				2			1		
		<b>CO/PO &amp; PSO Average</b>	2	1	1					1				2			1		
21154S24	ENGINEERING GRAPHICS	Use BIS conventions and specifications for engineering drawing.	3	1	2		2						3		2	2	2		
		Construct the conic curves, involutes and cycloid.	3	1	2		2							3		2	2	2	
		Solve practical problems involving projection of lines.	3	1	2		2							3		2	2	2	
		Draw the orthographic, isometric and perspective projections of simple solids.	3	1	2		2							3		2	2	2	
		Draw the development of simple solids.	3	1	2		2							3		2	2	2	
		<b>Avg.</b>	3	1	2		2							3		2	2	2	
21154L27	ENGINEERING PRACTICES LABORATORY	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.	3	2			1	1	1						2	2	1	1	
		Wire various electrical joints in common household electrical wire work.	3	2			1	1	1						2	2	1	1	
		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.	3	2			1	1	1							2	2	1	1
		<b>Avg.</b>	3	2			1	1	1							2	2	1	1

21153L28 C	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY	Use experimental methods to verify the Ohm's and Kirchhoff's Laws.	3	3	2	1	1			1	2						1		
		Analyze experimentally the load characteristics of electrical machines	3	3	2	1	1			1	2							1	
		Analyze the characteristics of basic electronic devices	3	3	2	1	1			1	2							1	
		Use DSO to measure the various parameters	3	3	2	1	1			1	2							1	
		Use DSO to measure the various measurements	3	3	2	1	1			1	2							1	
		<b>CO/PO &amp; PSO</b>	3	3	2	1	1			1	2								1
		<b>Average</b>																	
21148S31 D	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	Understand how to solve the given standard partial differential equations.	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-		
		Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-		
		Appreciate the physical significance of Fourier series techniques in solving one- and two- dimensional heat flow problems and one-dimensional wave equations.	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-		
		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.	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-		
		Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-		

		<b>Avg</b>	3	3	1	1	0	0	0	0	2	0	0	3	-	-	-
21154C3 2	ENGINEERING MECHANICS	Illustrate the vector and scalar representation of forces and moments	3	2	2	1	2							2	3	1	1
		Analyse the rigid body in equilibrium	3	2	2	1	2							2	3	1	1
		Evaluate the properties of distributed forces	3	2	3	1	2							2	3	1	2
		Determine the friction and the effects by the laws of friction	3	2	3	1	2							2	3	1	2
		Calculate dynamic forces exerted in rigid body	3	2	3	1	2							2	3	1	2
21154C3 3	ENGINEERING THERMODYNAMICS	Apply the zeroth and first law of thermodynamics by formulating temperature scales and calculating the property changes in closed and open engineering systems	3	3	2	1								2			
		Apply the second law of thermodynamics in analysing the performance of thermal devices through energy and entropy calculations	3	3	2	1								2			
		Apply the second law of thermodynamics in evaluating the various properties of steam through steam tables and Mollier chart	3	3	2	1				1		1	2	3			3
		Apply the properties of pure substance in computing the macroscopic properties of ideal and real gases using gas laws and appropriate thermodynamic relations	3	3	2	1		1		2		1	2	3	2		
		Apply the properties of gas mixtures in calculating the properties of gas mixtures and applying various thermodynamic relations to calculate property changes.	3	3	2	1		1		2		1	2	3	2	3	
21154C3 4	FLUID MECHANICS AND	Understand the properties and behaviour in static conditions. Also, to understand the conservation laws applicable to fluids and its application through fluid kinematics and dynamics	3	3	2	2	1	2	2	1	2	1	1	2	3	2	3

	<b>MACHINERY</b>	Estimate losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel. Also, to understand the concept of boundary layer and its thickness on the flat solid surface.	3	3	3	2	1	2	2	1	2	1	1	2	3	2	3
		Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performances of prototype by model studies	3	3	3	3	1	2	2	1	2	1	1	2	3	3	3
		Explain the working principles of various turbines and design the various types of turbines.	3	3	3	3	1	2	2	1	2	1	1	3	3	2	2
		Explain the working principles of centrifugal, reciprocating and rotary pumps and design the centrifugal and reciprocating pumps	3	3	3	3	1	2	2	1	2	1	1	3	3	2	2
<b>21154C3 5</b>	<b>ENGINEERING MATERIALS AND METALLURGY</b>	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.	3	1	3	2							2	2	1	2	
		Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.	3	1	3	1		2		1				2	2	1	2
		Clarify the effect of alloying elements on ferrous and non-ferrous metals.	3	1	3									2	2	1	2
		Summarize the properties and applications of non-metallic materials.	3	1	3				2					2	2	1	2
		Explain the testing of mechanical properties	3	1	3	2	2							2	2	1	2
<b>21154C3 6</b>	<b>MANUFACTURING PROCESSES</b>	Explain the principle of different metal casting processes.			2			2	3	1	1	-	-	1	3	1	-
		Describe the various metal joining processes.			2			2	3	1	1	-	-	1	3	1	-
		Illustrate the different bulk deformation processes.			2			2	2	1	1	-	-	1	3	1	-

		Apply the various sheet metal forming process.			2			2	2	1	1	-	-	1	3	1	-	
		Apply suitable molding technique for manufacturing of plastics components.			2		2	2	2	1	1	-	-	1	3	1	-	
21154L37	COMPUTER AIDED MACHINE DRAWING	Prepare standard drawing layout for modelled assemblies with BoM.	1	2			3			3	2			3	2	2	2	
		Model orthogonal views of machine components.	1	2			3			3	2			3	2	2	2	
		Prepare standard drawing layout for modelled parts	1	2			3			3	2			3	2	2	2	
21154L38	MANUFACTURING TECHNOLOGY LABORATORY	Demonstrate the safety precautions exercised in the mechanical workshop and join two metals using GMAW.	3						1	2				1	1	2	2	
		The students able to make the work piece as per given shape and size using machining process such as rolling, drawing, turning, shaping, drilling and milling.	3						1	2					1	1	2	2
		The students become make the gears using gear making machines and analyze the defects in the cast and machined components	3						1	2					1	1	2	2
21154C4 1	THEORY OF MACHINES	Discuss the basics of mechanism.	3	2	2		2			1				1	3		1	
		Solve problems on gears and gear trains.	3	2	2		2			1					1	3		1
		Examine friction in machine elements.	3	2	2		2			1					1	3		1
		Calculate static and dynamic forces of mechanisms.	3	2	2		2			1					1	3		1
		Calculate the balancing masses and their locations of reciprocating and rotating masses. Computing the frequency of	3	2	2		2			1					1	3		1

		free vibration, forced vibration and damping coefficient.																		
21154C4 2	THERMAL ENGINEERING	Apply thermodynamic concepts to different air standard cycles and solve problems.	3	2	1	1								1	2	1				
		Apply thermodynamic concepts to different air standard cycles and solve problems.	3	2	2	1									1	2	1			
		To solve problems in steam nozzle and calculate critical pressure ratio.	3	2	2	1									1	2	1			
		Explain the flow in steam turbines, draw velocity diagrams, flow in Gas turbines and solve problems.	3	2	1	1										1	2	1		
		Calculate the various performance parameters of IC engines	3	2	1	1										1	2	1		
21154C4 3	HYDRAULICS AND PNEUMATICS	Apply the working principles of fluid power systems and hydraulic pumps.	2	1	1	1									1	2	1	1		
		Apply the working principles of hydraulic actuators and control components.	2	1	1	1										1	2	1	1	
		Design and develop hydraulic circuits and systems.	2	1	1	1										1	2	1	1	
		Apply the working principles of pneumatic circuits and power system and its components.	2	1	1	1										1	2	1	1	
		Identify various troubles shooting methods in fluid power systems.	2	1	1	1										1	2	1	1	
21154C4 4	MANUFACTURING TECHNOLOGY	Apply the mechanism of metal removal process and to identify the factors involved in improving machinability.	3	3	3	1	1	1	3			3		2	3	3	2			
		Describe the constructional and operational features of centre lathe and other special purpose lathes.	3	3	3	1	1	1	3			3			2	3	2	2		

		Describe the constructional and operational features of reciprocating machine tools.	3	3	3	1	1	1	3			3		2	3	2	2
		Apply the constructional features and working principles of CNC machine tools.	3	3	2	1	1	1	3			3		2	3	2	2
		Demonstrate the Program CNC machine tools through planning, writing codes and setting up CNC machine tools to manufacture a given component	3	3	3	1	1	1	3			3		2	3	2	3
21154C4 5	STRENGTH OF MATERIALS	Understand the concepts of stress and strain in simple and compound bars, the importan	3	3	3	3	2	3	1	3	2	3	1	3	3	2	3
		of principal stresses and principal planes.	3	3	3	3	2	3	1	3	2	3	1	3	3	2	3
		Understand the load transferring mechanism in beams and stress distribution due shearing force and bending moment.	3	3	3	3	2	3	1	3	2	3	1	3	3	2	3
		Apply basic equation of torsion in designing of shafts and helical springs	3	3	3	3	2	3	1	3	2	3	1	3	3	2	3
		Calculate slope and deflection in beams using different methods.	3	3	3	3	2	3	1	3	2	3	1	3	3	2	3
21149S46	ENVIRONMENT AL SCIENCES AND SUSTAINABILIT Y	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
		To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	3	2	-	-	-	3	3	-	-	-	-	2	-	-	-
		To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
		To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	3	2	1	1	-	2	2	-	-	-	-	2	-	-	-

		To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-
		<b>Avg.</b>	2.8	1.8	1	1	-	2.2	2.4	-	-	-	-	1.8	-	-	-
21154L47	<b>STRENGTH OF MATERIALS AND FLUID MACHINERY LABORATORY</b>	Determine the tensile, torsion and hardness properties of metals by testing	3	2	1	3	3	1	1	1	3	1	1	2	2	2	1
		Determine the stiffness properties of helical and carriage spring	3	2	1	3	3	1	1	1	3	1	1	2	3	2	1
		Apply the conservation laws to determine the coefficient of discharge of a venturimeter	3	3	2	3	2	1	1	1	3	1	1	2	3	2	1
21154L48	<b>THERMAL ENGINEERING LABORATORY</b>	Conduct tests to evaluate performance characteristics of IC engines	2	2	1	1					1			1	1	1	1
		Conduct tests to evaluate the performance of refrigeration cycle	2	2	1	1					1			1	1	1	1
		Conduct tests to evaluate Performance and Energy Balance on a Steam Generator	2	2	1	1					1			1	1	1	1
21154C5 1	<b>DESIGN OF MACHINE ELEMENTS</b>	Explain the design machine members subjected to static and variable loads.	2	2	3					1	1			2	3	2	2
		Apply the concepts design to shafts, key and couplings.	2	2	3					1	1			2	3	2	2
		Apply the concepts of design to bolted, Knuckle, Cotter, riveted and welded joints.	2	2	3					1	1			2	3	2	2
		Apply the concept of design helical, leaf springs, flywheels, connecting rods and crank shafts.	2	2	3					1	1			2	3	2	2
		Apply the concepts of design and select sliding and rolling contact bearings, seals and gaskets.	2	2	3					1	1			2	3	2	2



21154C5 2	<b>METROLOGY AND MEASUREMENT S</b>	Discuss the concepts of measurements to apply in various metrological instruments.	3	2	2	2					1			1	3	2	1	
		Apply the principle and applications of linear and angular measuring instruments, assembly and transmission	3	2	2	2					1				1	3	2	1
		Apply the tolerance symbols and tolerance analysis for industrial applications.	3	2	2	2					1				1	3	2	1
		Apply the principles and methods of form and surface metrology.	3	2	2	2					1				1	3	2	1
		Apply the advances in measurements for quality control in manufacturing Industries.	3	2	2	2					1				1	3	2	1
21154L58	<b>METROLOGY AND DYNAMICS LABORATORY</b>	The students able to measure the gear tooth dimensions, angle using sine bar, straightness.		2	2	3		2	2		1	2	2		3	2	2	
		Determine mass moment of inertia of mechanical element, governor effort and range of sensitivity.		2	2	3		2	2		1	2	2		2	2	2	
		Determine the natural frequency and damping coefficient, critical speeds of shafts,		2	2	3		2	2		1	2	2		3	2	2	
		<b>Avg</b>	-	2	2	3	-	2	2	-	1	2	2	-	2	2	2	
21154C6 2	<b>HEAT AND MASS TRANSFER</b>	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems.	3	3	3	2					1			1	3	2	1	
		Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems	3	3	3	3					1				1	3	2	1
		Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems	3	3	3	2					1				1	3	2	1

		Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems	3	3	3	2					1			1	3	2	1
		Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications.	3	3	3	2					1			1	3	2	1
21154L68	CAD/CAM LABORATORY	Design experience in handling 2D drafting and 3D modelling software systems	2	2	2	2	3				2			1	3	3	1
		Design 3 Dimensional geometric model of parts, sub-assemblies, assemblies and export it to drawing	2	2	2	2	3				2			1	3	3	1
		Demonstrate manual part programming and simulate the CNC program and Generate part programming using G and M code through CAM software.	2	2	2	2	3				2			1	3	3	1
21154L69	HEAT TRANSFER LABORATORY	Conduct experiment on Predict the thermal conductivity of solids and liquids		1	3	2					1			1	2	2	3
		Conduct experiment on Estimate the heat transfer coefficient values of various fluids.		1	3	2					1			1	2	2	3
		Conduct experiment on Test the performance of tubes in tube heat exchangers		1	3	2					1			1	2	2	3
21154C7 5	MECHATRONICS AND IoT	Explain Select suitable sensors and actuators to develop mechatronics systems.					1	-	-	-	-	-	-	-	1	2	3
		Discuss Devise proper signal conditioning circuit for mechatronics systems, and also able to implement PLC as a controller for an automated system.					2	-	-	-	1	-	-	2	1	2	3
		Elucidate the fundamentals of IoT and Embedded Systems					2	-	2	-	-	-	-	-	1	2	3
		Discuss Control I/O devices through Arduino and Raspberry Pi.					3	-	-	-	3	-	-	3	1	2	3

		Design and develop an apt mechatronics/IoT based system for the given real-time application.					3	-	2	-	3	-	-	3	1	2	3
		Discuss the basics of computer aided engineering.	3	2	2	1	2				1			1	2	1	3
		Choose appropriate automotive tools and material handling systems.	3	2	2	1	2				1			1	2	1	3
		Discuss the overview of group technology, FMS and automation identification methods.	3	2	2	1	2				1			1	2	1	3
21154C7 6	<b>COMPUTER INTEGRATED MANUFACTURING</b>	Design using computer aided process planning for manufacturing of various components	3	2	2	1	2				1			1	2	1	3
		Acquire knowledge in computer process control techniques.	3	2	2	1	2				1			1	2	1	3
		Discuss basic concepts of management; approaches to management; contributors to management studies; various forms of business organization and trade unions function in professional organizations.	1	1	1	1		3	2	3	2	3	2	3	1	1	1
		Discuss the planning; organizing and staffing functions of management in professional organization.	1	1	1	1		3	2	3	2	3	2	3	1	1	1
		Apply the leading; controlling and decision making functions of management in professional organization.	1	1	1	1		3	2	3	2	3	2	3	1	1	1
21154C7 7	<b>INDUSTRIAL MANAGEMENT</b>	Discuss the organizational theory in professional organization.	1	1	1	1		3	2	3	2	3	2	3	1	1	1
		Apply principles of productivity and modern concepts in management in professional organization	1	1	1	1		3	2	3	2	3	2	3	1	1	1
		Familiarization with concept of IoT and its open source microcontroller/SBC.	1	3	-	-	-	3	-	-	3	1	1	3	-	-	-
		Write a program to turn ON/OFF motor using microcontroller/SBC through internet.	1	3	-	-	-	3	-	-	3	1	1	3	-	-	-

		Write a program to interface sensors to display the data on the screen through internet.	1	3	-	-	-	3	-	-	3	1	1	3	-	-	-	
		Interface the sensors with microcontroller/SBC and write a program to turn ON/OFF	3	3	-	-	-	3	-	-	3	3	3	3	-	-	-	
		Take up any challenging practical problems and find solution by formulating proper methodology.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		<b>Avg.</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>21154E53 A</b>	<b>CAD/CAM</b>	Discuss the basics of the design and concepts.	3	2	2	2	2				1			1	3	3	2	
		Develop the two dimensional drafting and projection views.	3	2	2	2	2				1			1	3	3	2	
		Discuss the three dimensional modeling, parametric and Non-parametric modeling	3	2	2	2	2				1			1	3	3	2	
		Discuss the assembly modeling and top down, bottom up approaches.	3	2	2	2	2				1			1	3	3	2	
		Develop the computer aided machining and wiring part programming	3	2	2	2	2				1			1	3	3	2	
<b>21154E54 A</b>	<b>ROBOTICS</b>	State the basic concepts and terminologies of robots	3	2	3	1	2							1	2	1	3	
		Know the Procedures for Forward and Inverse Kinematics, Dynamics for Various Robots	3	2	3	1	2								1	2	1	3
		Derive the Forward and Inverse Kinematics, Dynamics for Various Robots	3	2	3	1	2								1	2	1	3
		Apply the various programming techniques in industrial applications Analyze the use of various types of robots in different applications	3	2	3	1	2								1	2	2	3

		CO5	3	2	3	1	3							1	2	2	3	
		CO/PO & PSO Average	3	2	3	1	2							1	2	1.4	3	
21154E55 A	AUTOMOBILE ENGINEERING	Recognize the various parts of the automobile and their functions and materials.		1	2	1				1				1	1	2	1	
		Discuss the engine auxiliary systems and engine emission control.		1	2	1				1					1	1	2	1
		Distinguish the working of different types of transmission systems.		1	2	1				1					1	1	2	1
		Explain the Steering, Brakes and Suspension Systems.		1	2	1				1					1	1	2	1
		Predict possible alternate sources of energy for IC Engines.		1	2	1				1					1	1	2	1
21154E65 A	POWER PLANT ENGINEERING	Explain the layout, construction and working of the components inside a thermal power plant.	3	1	1	1		1	3			1		1	2	2	1	
		Explain the layout, construction and working of the components inside a Diesel, Gas and	3	1	1	1		1	3			1		1	2	2	1	
		Combined cycle power plants.	3	1	1	1		1	3			1		1	2	2	1	
		Explain the layout, construction and working of the components inside nuclear power plants.	3	1	1	1		1	3			1		1	2	2	1	
		Explain the layout, construction and working of the components inside Renewable energy	3	1	1	1		1	3			1		1	2	2	1	

21154E64 D	NON- TRADITIONAL MACHINING PROCESSES	Formulate different types of non-traditional machining processes and evaluate mechanical energy based non-based non-traditional machining processes.	3		1		1		1		1	1		1	2	2	2
		Illustrate chemical and electro chemical energy based processes.	3		1		1		1		1	1		1	2	2	2
		Evaluate thermo-electric energy based processes.	3		1		1		1		1	1		1	2	2	2
		Interpret nano finishing processes.	3		2		1		1		1	1		1	2	2	2
		Analyse hybrid non-traditional machining processes and differentiate non- traditional machining processes.	3		3		3		1		1	1		1	3	3	3
		Evaluate the fuel properties and arrive at proximate and ultimate analysis of fuels.	3	1	1	1					1			1	2	1	1
		Analyze different types of boilers and compute their performance parameters.	3	2	1	1					1			1	2	1	1
		Evaluate the performance parameters of an air compressor	3	1	1	1					1			1	2	1	1
21154E63 B	THERMAL POWER ENGINEERING	Apply the working principles of various refrigeration systems and perform cop calculations	3	2	1	1				1			1	2	1	1	
		Analyze the psychrometric properties and how they are utilized in arriving at calculations to determine heating loads.	3	1	1	1					1			1	2	1	1
		Apply the fundamentals of compressible flow concepts and the use of gas tables.	3	2	1	1					1			1	3	1	2
		Analyze the compressible flow behaviour in constant area ducts.	3	2	1	1					1			1	3	1	2
		Analyze the development of shock waves and its effects.	3	2	1	1					1			1	3	1	2

21154E66 A	GAS DYNAMICS AND JET PROPULSION	Explain the types of jet engines and their performance parameters.	3	2	1	1					1			1	3	1	2	
		Explain the types of rocket engines and their performance parameters.	3	2	1	1					1				1	3	1	2
		Expand their vocabulary and gain practical techniques to read and comprehend a wide range of texts with the emphasis required	1	3	3	1	3	3	3	3	1	3	1	3	-	-	-	
		Identify errors with precision and write with clarity and coherence	2	3	3	2	3	3	3	3	1	3	3	3	-	-	-	
		Understand the importance of task fulfilment and the usage of task-appropriate vocabulary	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	
		Communicate effectively in group discussions, presentations and interviews	2	2	2	2	2	2	2	2	3	3	3	3	-	-	-	
		Write topic based essays with precision and accuracy	2	2	2	2	2	2	2	2	2	3	2	3	-	-	-	
		<b>AVg.</b>	2	2 .6	2. 6	2	2 .6	2 .6	2 .6	2 .6	2	3	2. 4	3	-	-	-	
21150E76 A	ENGLISH FOR COMPETITIVE EXAMINATIONS	Expand their vocabulary and gain practical techniques to read and comprehend a wide range of texts with the emphasis required	1	1	3	3	1	3	3	3	3	1	3	1	3	-	-	
		Identify errors with precision and write with clarity and coherence	2	2	3	3	2	3	3	3	3	1	3	3	3	-	-	
		Understand the importance of task fulfilment and the usage of task-appropriate vocabulary	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	
		Communicate effectively in group discussions, presentations and interviews	4	2	2	2	2	2	2	2	2	3	3	3	3	-	-	
		Write topic based essays with precision and accuracy	5	2	2	2	2	2	2	2	2	2	3	2	3	-	-	

211500E 74B	GEOGRAPHICAL INFORMATION SYSTEM	Discuss the importance of economic sustainability.	3	-	2	-	-	-	2	2	-	1	1	2	2	2	1	
		Describe the importance of sustainable practices.	3	-	-	-	-	-	2	-	-	1	1	2	1	2	2	
		Plan for sustainable operation of industry with environmental, cost consciousness.	3	-	-	-	-	-	2	3	-	1	1	2	1	2	2	
		Identify drivers and barriers for the given conditions	3	-	3	-	-	-	2		-	1	1	2	2	2	2	1
		Formulate strategy in sustainable manufacturing.	3	-	3	-	-	-	2	2	-	1	1	2	2	2	2	1

  
HOD

Department of Mechanical Engineering  
Ponnaiyah Ramajayam Institute of  
Science & Technology (PRIST)  
Institution Deemed to be University  
's 3 of the UGC Act 1956  
VALLIAM, THANJAVUR - 613 403, TAMIL NADU.

  
DEAN

School of Engineering and Tech.  
Ponnaiyah Ramajayam Institute of  
Science and Technology (PRIST)  
Deemed to be University  
Valliam, Thanjavur-613 403.