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	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	**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.
3	**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.
4	**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.
5	**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.
6	**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.

HOD
Department of Mechanical Engineering
Ponnaiyah Ramalayam Institute of
Science & Technology (PRIST)
(Institution Deemed to be University
s 3 of the UGC Act 1956)
NJAVUR - 813 403, TAMIL NADU.

DEAN
School of Engineering and Tech.
Ponnaiyah Ramalayam Institute of
Science and Technology (PRIST)
Deemed to be University
Vallam, Thanjavur-613 4.

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
II.	3	2	2	2	2	1	1	1	3		2	1	2	3	3
III.	3	1	2	1	2	2	1		1	2		3	3	2	2
IV.	2	2	2	2	2		2				1	2	2	3	3
V.	3	2	2	2	1	3	2	2	2	1	1	3	3	2	2

PRIST
DEEMED TO BE
UNIVERSITY
NAAC ACCREDITED
THANJAVUR – 613 403 - TAMIL NADU
SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

B.TECH - PART TIME (UG - 2022)

COURSE CODE	COURSE TITLE	CO	COURSE OUTCOMES	PO 1	PO 2	P O3	PO 4	PO 5	PO 6	PO 7	PO8	PO 9
22148C11P	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	CO1	Understand how to solve the given standard partial differential equations.	✓								
		CO2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.		✓							
		CO3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.			✓						
		CO4	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.								✓	
		CO5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.									✓
22154C12P	ELECTRICAL DRIVES AND CONTROLS	CO1	Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance	✓								
22154C13P	ENGINEERING THERMODYNAMICS	CO1	Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions.	✓								

Code	Course	CO	Description												
		CO2	Apply second law of thermodynamics to open and closed systems and calculate entropy and availability.		✓										
		CO3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods			✓									
		CO4	Derive simple thermodynamic relations of ideal and real gases									✓			
		CO5	Calculate the properties of gas mixtures and moist air and its use in psychometric processes											✓	
22154C14P	FLUID MECHANICS AND MACHINERY	CO1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.	✓											
		CO2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks.		✓										
		CO3	Can mathematically predict the nature of physical quantities			✓									
		CO4	Can critically analyse the performance of pumps					✓							
		CO5	Can critically analyse the performance of turbines.						✓						
22154C15P	MANUFACTURING TECHNOLOGY - I	CO1	Explain different metal casting processes, associated defects, merits and demerits			✓									
		CO2	Compare different metal joining processes.					✓							
		CO3	Summarize various hot working and cold working methods of metals.						✓						
		CO4	Explain various sheet metal making processes.							✓					

Course Code	Course Name	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO5	Distinguish various methods of manufacturing plastic components.											✓	
22148S21P	NUMERICAL METHODS	CO1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	✓											
		CO2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.		✓										
		CO3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.				✓								
		CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.					✓							
		CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications						✓						
22154C22P	MANUFACTURING TECHNOLOGY - II	CO1	Explain the mechanism of material removal processes.	✓											
		CO2	Describe the constructional and operational features of centre lathe and other special purpose lathes.				✓								
		CO3	Describe the constructional and operational features of shaper, planner, milling, drilling,sawing and broaching machines.					✓							
		CO4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes.						✓						
		CO5	Summarize numerical control of machine tools and write a part program.											✓	

Course Code	Course Name	CO	Course Outcome								
22154C23P	THERMAL ENGINEERING	CO1	Apply thermodynamic concepts to different air standard cycles and solve problems.	✓							
		CO2	Solve problems in single stage and multistage air compressors		✓						
		CO3	Explain the functioning and features of IC engines, components and auxiliaries.					✓			
		CO4	Calculate performance parameters of IC Engines.			✓					
		CO5	Explain the flow in Gas turbines and solve problems.				✓				
22154C24P	STRENGTH OF MATERIALS	CO1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.	✓							
		CO2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.		✓						
		CO3	Apply basic equation of simple torsion in designing of shafts and helical spring			✓					
		CO4	Calculate the slope and deflection in beams using different methods.				✓				
		CO5	Analyze and design thin and thick shells for the applied internal and external pressures.					✓			
22154C25P	ENGINEERING MATERIALS AND METALLURGY	CO1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.						✓		
		CO2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.						✓		
		CO3	Clarify the effect of alloying elements on ferrous and non-ferrous metals						✓		

Course Code	Course Name	CO	Description											
		CO4	Summarize the properties and applications of non metallic materials.							✓			
		CO5	Explain the testing of mechanical properties. .							✓			
22148S31CP	PROBABILITY AND STATISTICS	CO1	The main objective of this course is to provide students with the foundations of probabilistic and statistical analysis mostly used in varied applications in engineering and science like disease modeling, climate prediction and computer networks etc.	✓									
22154C32P	KINEMATICS OF MACHINERY	CO1	Discuss the basics of mechanism	✓									
		CO2	Calculate velocity and acceleration in simple mechanisms		✓								
		CO3	Develop CAM profiles			✓							
		CO4	Solve problems on gears and gear trains					✓					
		CO5	Examine friction in machine elements					✓					
22154C33P	COMPUTER AIDED DESIGN AND MANUFACTURING	CO1	Upon completion of this course, the students can able to prepare production planning and control activities such as work study, product planning, production scheduling, Inventory Control.	✓									
		CO2	They can plan manufacturing requirements manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP).		✓								
22154C34P	ENGINEERING METROLOGY AND	CO1	Describe the concepts of measurements to apply in various metrological instruments	✓									

Sub Code	Subject	CO	Course Outcome	1	2	3	4	5	6	7	8	9
	MEASUREMENTS	**CO2**	Outline the principles of linear and angular measurement tools used for industrial Applications			✓						
		CO3	Explain the procedure for conducting computer aided inspection				✓					
		CO4	Demonstrate the techniques of form measurement used for industrial components								✓	
		CO5	Discuss various measuring techniques of mechanical properties in industrial applications									✓
22154L35P	**COMPUTER AIDED SIMULATION AND ANALYSIS LABORATORY**	**CO1**	simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder and cam follower mechanisms using MATLAB.	✓								
		CO2	analyze the stresses and strains induced in plates, brackets and beams and heat transfer problems.						✓			
		CO3	calculate the natural frequency and mode shape analysis of 2D components and beams.								✓	
22154C41P	**POWER PLANT ENGINEERING**	**CO1**	Explain the layout, construction and working of the components inside a thermal power plant.	✓								
		CO2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.		✓							
		CO3	Explain the layout, construction and working of the components inside nuclear power plants.			✓						
		CO4	Explain the layout, construction and working of the components inside Renewable energy power plants.				✓					
		CO5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and									✓

Course Code	Course Name	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11
			estimate the costs of electrical energy production.											
22154C42P	DYNAMICS OF MACHINERY	CO1	Discuss the basics of mechanism	✓										
		CO2	Calculate velocity and acceleration in simple mechanisms		✓									
		CO3	Develop CAM profiles			✓								
		CO4	Solve problems on gears and gear trains					✓						
		CO5	Examine friction in machine elements					✓						
22154C43P	DESIGN OF MACHINE ELEMENTS	CO1	Explain the influence of steady and variable stresses in machine component design.		✓									
		CO2	Apply the concepts of design to shafts, keys and couplings.				✓							
		CO3	Apply the concepts of design to temporary and permanent joints.								✓			
		CO4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.									✓		
		CO5	Apply the concepts of design to bearings.											✓
22154E44DP	RENEWABLE SOURCES OF ENERGY	CO1	Understand the need of energy conversion and the various methods of energy storage	✓										
		CO2	Identify Winds energy as alternate form of energy and to know how it can be tapped		✓									

Course Code	Course Name	CO	CO Statement	1	2	3	4	5	6	7	8	9	10	11	12
		CO3	Understand the Geothermal &Tidal energy, its mechanism of production and its applications			✓									
22154L45P	**DYNAMICS LABORATORY**	CO1	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipments.	✓											
		CO2	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency and damping coefficient, torsional frequency, critical speeds of shafts, balancing mass of rotating and reciprocating masses, and transmissibility ratio.		✓										
22154C51P	**HEAT AND MASS TRANSFER**	CO1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems	✓											
		CO2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems		✓										
		CO3	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			✓									
		CO4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems				✓								
		CO5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications											✓	
22154C52P	**DESIGN OF TRANSMISSION SYSTEMS**	CO1	apply the concepts of design to belts, chains and rope drives.		✓										
		CO2	apply the concepts of design to spur, helical gears.				✓								

Course Code	Course Name	CO	CO Description	1	2	3	4	5	6	7	8	9	10	11	12
		CO3	apply the concepts of design to worm and bevel gears.										✓		
		CO4	apply the concepts of design to gear boxes .										✓		
		CO5	apply the concepts of design to cams, brakes and clutches												✓
22154C53P	SAFETY IN PROCESS INDUSTRIES	CO1	recognize the various parts of the automobile and their functions and materials.	✓											
		CO2	discuss the engine auxiliary systems and engine emission control.		✓										
		CO3	distinguish the working of different types of transmission systems.			✓									
		CO4	explain the Steering, Brakes and Suspension Systems.				✓								
		CO5	predict possible alternate sources of energy for IC Engines.	✓											
22154E54CP	ROBOTICS	CO1	Demonstrate knowledge of industrial robots, characteristics, end effectors and actuators.												
		CO2	Apply spatial transformation to obtain forward and inverse kinematics												
		CO3	Solve robot dynamics problems, generate joint trajectory for path planning												
		CO4	Describe working principle of various sensors and program different operations												
		CO5	Appreciate applications of robots in industry.												

Course Code	Course Name	CO	CO Statement	1	2	3	4	5	6	7	8	9	10	11	12
22154L55P	**HEAT TRANSFER LABORATORY**	CO1	conduct tests on heat conduction apparatus and evaluate thermal conductivity of materials.	✓											
		CO2	conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.		✓										
		CO3	conduct tests on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.			✓									
		CO4	conduct tests to evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.				✓								
		CO5	conduct tests to evaluate the performance of refrigeration and airconditioning test rigs.					✓							
22154C61P	**FINITE ELEMENT ANALYSIS**	CO1	Summarize the basics of finite element formulation.	✓											
		CO2	Apply finite element formulations to solve one dimensional Problems.		✓										
		CO3	Apply finite element formulations to solve two dimensional scalar Problems.			✓									
		CO4	Apply finite element method to solve two dimensional Vector problems.												✓
		CO5	Apply finite element method to solve problems on iso parametric element and dynamic Problems.												✓
22154C62P	**MECHATRONICS**	CO1	Discuss the interdisciplinary applications of Electronics, Electrical, Mechanical andComputer Systems for the Control of Mechanical, Electronic Systems and sensor technology.	✓											
		CO2	Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing		✓										

Course Code	Course Name	CO	Description												
			Modes of Microprocessor and Microcontroller.												
		CO3	Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device Interfacing			✓									
		CO4	Explain the architecture, programming and application of programmable logic controllers to problems and challenges in the areas of Mechatronic engineering.					✓							
		CO5	Discuss various Actuators and Mechatronics system using the knowledge and skills acquired through the course and also from the given case studies					✓							
22154C63P	MAINTENANCE ENGINEERING	CO1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics	✓											
		CO2	Explain the fundamentals of parametric curves, surfaces and Solids			✓									
		CO3	Summarize the different types of Standard systems used in CAD					✓							
		CO4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines						✓						
		CO5	Summarize the different types of techniques used in Cellular Manufacturing and FMS			✓									
22154E64AP	PRINCIPLES OF MANAGEMENT	CO1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management						✓						

Course Code	Course Name	CO	Course Outcome												
22154L65P	MECHATRONICS LABORATORY	CO1	Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic and electrical systems.	✓											
		CO2	Demonstrate the functioning of control systems with the help of PLC and microcontrollers.		✓										
22160S71P	TOTAL QUALITY MANAGEMENT	CO1	To get familiarized with the basic concept and framework of Total Quality management												
		CO2	To Understand the contribution of Quality Gurus in TQM Journey												
		CO3	To grasp the nature and importance of various components that constitute TQM												
		CO4	To describe and discuss the role of techniques used in TQM												
22154C72P	PROCESS PLANNING AND COST ESTIMATION	CO1	select the process, equipment and tools for various industrial products.	✓											
		CO2	prepare process planning activity chart.		✓										
		CO3	explain the concept of cost estimation.			✓									
		CO4	compute the job order cost for different type of shop floor.				✓								
		CO5	calculate the machining time for various machining operations.										✓		
22154C73P	ADVANCED I.C. ENGINES	CO1	Explain the Fluid power and operation of different types of pumps.	✓											
		CO2	Summarize the features and functions of Hydraulic motors, actuators and Flow control Valves		✓										

Course Code	Course Name	CO	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		CO3	Explain the different types of Hydraulic circuits and systems				✓								
		CO4	Explain the working of different pneumatic circuits and systems											✓	
		CO5	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.											✓	
22154E74CP	UNCONVENTIONAL MACHINING PROCESSES	CO1	Explain the need for unconventional machining processes and its classification	✓											
		CO2	Compare various thermal energy and electrical energy based unconventional machining processes.		✓										
		CO3	Summarize various chemical and electro-chemical energy based unconventional machining processes.			✓									
		CO4	Explain various nano abrasives based unconventional machining processes.											✓	
		CO5	Distinguish various recent trends based unconventional machining processes.												✓
22154P75P	PROJECT WORK	CO1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.	✓											

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
M.TECH - MANUFACTURING ENGINEERING- FULL TIME (PG_2022)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES	PO					
			1	2	3	4	5	6
22248S11	ADVANCED ENGINEERING MATHEMATICS	Analyze the performance in terms of probabilities and distributions achieved by the determined solutions.	2	-	-	-	-	2
		Be familiar with some of the commonly encountered two dimensional random variables and be equipped for a possible extension to multivariate analysis.	-	-	-	-	-	-
		Apply the basic principles underlying statistical inference(hypothesis testing).	2	-	-	-	1	2
		Demonstrate knowledge of applicable large sample theory of estimators and tests.	-	-	3	1	-	-
		Obtain a better understanding of the importance of the methods in modern industrial processes.	-	-	3	-	-	2
		Avg.	**2**	**-**	**3**	**1**	**1**	**2**
22254C12	THEORY OF MACHINE CUTTING	Basics of orthogonal cutting, oblique cutting and chip formation	1	-	-	-	-	1
		Different tool materials, tool life and tool wear mechanisms	-	-	2	3	2	-
		Necessity for a cutting fluid and cutting efficiency	1	-	-	-	2	1
		Single and Multipoint cutting tools	-	-	-	-	-	2
		Effect of vibrations and surface roughness during machining	2	-	3	-	-	-
		Avg.	**1.33**	**-**	**2.5**	**3**	**2**	**1.33**
22254C13	ADVANCED MANUFACTURING PROCESSES	Analyze the processes and evaluate the role of each process parameter during machining of various advanced materials.	1	-	-	-	-	-

Course Code	Course	Course Outcome						
		Understand requirements to achieve maximum material removal rate and best quality of machined surface while machining various industrial engineering materials.	-	-	-	-	2	-
		Analyze the different bulk metal forming process mechanics using different analysis	-	-	3	-	-	2
		Acquire the knowledge in mechanical micromachining processes.	1	-	-	-	2	-
		Demonstrate the knowledge of Additive Manufacturing and Rapid Prototyping Technologies	-	-	-	1	-	-
		Avg.	1	-	3	1	2	2
22254C14	**ADVANCES IN CASTING & WELDING**	At the end of this course the students are expected to impart knowledge on basic concepts and advances in casting and welding processes.	1	-	-	-	-	1
		Know and perform solid state and special welding processes.	-	-	2	3	2	-
		Understand and analyze the material structures after welding.	1	-	-	-	2	1
		Design the weldments for various materials.	-	-	-	-	-	2
		Attain the knowledge about various welding defects and inspection methods.	2	-	3	-	-	-
		Avg.	**1.33**	-	**2.5**	**3**	**2**	**1.33**
22254C15	**AUTOMATED COMPUTER INTEGRATED MANUFACTURING SYSTEMS**	Recognize the importance of CAD, CAM, CIM, Engineering product specification and interpreting geometric specifications.	-	-	-	2	2	-
		Improve knowledge on the integration of CAD and CAM.	-	-	-	-	2	1
		Exhibit competency in manual part program and generation of CNC part program using CAM packages.	1	2	-	3	-	-
		Describe the implementation of CAD and CAM in manufacturing processes.	2	-	-	-	1	2

Code	Course	CO Statement						
		Explain applications of IOT in computer aided manufacturing.	-	-	-	-	3	1
		Avg.	1.5	2	-	2.5	2	1.33
22254E16C	**MANUFACTURING INFORMATION SYSTEMS**	Able to acquire knowledge on facility, and problems associated with it.	2	1			1	
		Ability to learn the various capacity and layout planning models	2	1			1	
		Understand the concepts of demand forecasting and project management with relevant case studies.	2	1			1	
		Able to understand the concepts of production planning and scheduling.	2	1				
		Understand the various inventory and maintenance management techniques.	2	1				
		Avg	(10/5) =2	(5/5) =1			(3/3) =1	
22254L17	**CAD/CAM LABORATORY**	Interpret mechanical drawings for components, assemblies and use parametric 3D CAD software tools in the correct manner for creating their geometric part models, assemblies and automated drawings.	1	-	-	-	2	1
		Apply the concepts of machining for the purpose of selection of appropriate machining centres, machining parameters, select appropriate cutting tools for CNC milling and turning equipment, set-up, program, and operate CNC milling and turning equipment.	-	-	-	3	2	1
		Create and validate NC part program data using manual data input (MDI) and automatically using standard commercial CAM package for manufacturing of required component using CNC milling or turning applications.	-	-	-	-	2	1
		Produce an industrial component by interpreting 3D part model/ part drawings using Computer Aided Manufacturing technology through programming, setup, and ensuring safe operation of Computer Numerical Control (CNC) machine tools.	-	2	-	2	3	-
		Create and demonstrate the technical documentation for design/ selection of	-	-	-	-	-	2

Course Code	Course Name	Course Outcome						
		suitable drive technologies, precision components and an overall CNC machine tool system for automation of machining operations using appropriate multi-axis CNC technology.						
		Avg.	1	2	-	2.5	2.25	1.25
22254C21	**TOOLING FOR MANUFACTURING**	At the end of this course the students will be expected to introduce the various optimization techniques and their advancements.	2	-	-	3	2	-
		Ability to go in research by applying optimization techniques in problems of Engineering and Technology	1	-	-	2	3	-
		Use classical optimization techniques and numerical methods of optimization.	1	-	-	2	2	-
		Describe the basics of different evolutionary algorithms	-	2	-	-	-	-
		Ability to solve the mathematical results and numerical techniques of optimization theory to concrete Engineering problems by using computer software	1	-	-	3	-	2
		Avg.	1.25	2	-	2.5	2.33	2
22254C22	**MEMS AND NANO TECHNOLOGY**	Realise the need of micro electromechanical systems.	1	-	-	2	-	1
		Develop a knowledge to select a sensor for an application	1	-	-	2	2	-
		Develop a nano material	-	-	3	2	-	-
		characterize the Nano material	-	-	3	2	-	-
		Develop an Electromechanical systems	-	-	-	2	2	2
		Avg	1	-	3	2	2	1.5
22254C23	**MANUFACTURING METROLOGY AND QUALITY CONTROL**	Understand the advanced measurement principles with ease.	1	-	-	1	1	-
		Operate sophisticated and accurate measuring instruments.	1	-	-	1	-	2
		Understand the various inspection methods and tools	1	-	3	-	2	1
		Design and develop new measuring methods.	1	-	-	1	2	1
		Apply computers in Measurement	-	-	-	1	2	1
		Avg.	1	-	3	1	1.75	1.25
22254E24B	**LEAN**	To know the necessity for a Lean Manufacturing system	1	-	-	-	-	-

	MANUFACTURING	To Differentiate between the conventional Mass production system with Lean system	-	1	3	-	1	-
		In effectively implement the principles of JIT	-	-	3	-	-	-
		To apply the Inspection tools effectively in the Lean systems	1	-	-	2	-	1
		To apply Hoshin planning system to create a Lean culture in Industry	1	2	-	-	2	2
		Avg.	1	1.5	3	2	1.5	1.5
22254E25B	**MAINTENANCE MANAGEMENT**	An understanding of sustainability management as an approach to aid in evaluating and minimizing environmental impacts while achieving the expected social impact.	3	3	2	1	2	2
		An understanding of corporate sustainability and responsible Business Practices	3	2	2	2	1	2
		Knowledge and skills to understand, to measure and interpret sustainability performances	3	3	1	2	2	3
		Knowledge of innovative practices in sustainable business and community management	3	3	2	1	1	2
		Deep understanding of sustainable management of resources and commodities	3	3	2	1	2	2
22254L26	**AUTOMATION LAB**	To impart practical knowledge on bulk metal forming processes	-	2	1	2	-	-
		Know various symbols used in Hydraulic and Pneumatic circuits	-	2	-	2	-	-
		Conduct few sheet metals forming processes and analyse the parameters	-	2	-	-	3	1
		Design hydraulic circuits for industrial applications	-	2	-	-	2	1
		Learnt how to use automation studio	-	2	-	-	2	1
		Avg.	-	2	1	2	2.33	1

Code	Course	Outcome						
222TECWR	**TECHNICAL WRITING/SEMINAR**	To develop skills to search, read, write, comprehend and present research papers in the areas of manufacturing engineering.	1	1	-	-	2	-
		Updated with the latest technology in the field of Manufacturing Engineering	1	2	3	-	2	-
		Able to plot graph, sketch, bring out the visual about his understanding on various topics	1	2	3	-	2	-
		Avg.	1	1.66	3	-	2	-
22254C31	**METAL FORMING PROCESS**	At the end of this course the students are expected to upgrade their knowledge on various metal forming techniques and formability	-	-	-	-	-	-
		Apply the theory of plasticity for various types of metal forming process.	1	-	-	-	-	-
		Apply the concept of powder metallurgy to make prismatic components	1	-	-	2	1	2
		Understand Non-traditional forming processes.	1	-	2	2	-	-
		Understand the purpose of surface treatment in metal forming applications	-	-	1	-	2	3
		Avg.	1	-	1.5	2	1.5	2.5
22254E32A	**PROCESS PLANNING AND COST ESTIMATION**	Explain the concept of selection and steps in process planning, tooling,equipment selection and material evaluation	1	-	2	-	-	1
		Calculate process parameters and select Jig, Fixtures and quality assurance methods	2	-	-	3	-	2
		Apply the methods of costing and to explain the concept of estimation.	-	1	2	-	-	-
		Compute the cost of the product in various shops of production.	1	-	3	2	1	2
		Calculate the machining time for various operation	1	1	-	3	-	3
		Avg.	1.66	1	2.33	2.66	1	2
22254E33A	**PRODUCT DESIGN**	Identify the need for a New Product	2	-	-	3	-	1

Code	Course	Outcome						
	AND DEVELOPMENT	design and develop various products	1	-	3	1	1	1
		Work out the cost of developing a product	-	-	-	2	2	1
		Will be able to prototype the product	1	-	3	3	2	1
		Know how to patent the new design or the product	1	-	-	-	2	2
		Avg.	1.25	-	3	2.25	1.75	1.2
22254E34B	INDUSTRIAL SAFETY	Expected to gain knowledge and skills needed to run an industry with utmost safety precautions.	1	-	-	2	1	1
		Understand the industrial laws, regulations and source models.	-	-	3	2	1	-
		Apply the methods of prevention of fire and explosions.	1	1	-	2	2	2
		Analyse the effect of release of toxic substances	1	1	-	2	-	2
		Understand the methods of hazard identification and preventive measures.	-	1	-	2	1	2
		Avg.	1	1	3	2	1.25	1.75
22254P35	PROJECT WORK PHASE I	Design and analyze, an identified problem using scientific tools	1	2		3	2	
		Simulation/ Theoretical analysis of a physical system	2	2		1		
		Integrate various domain knowledge for a sustainable solution.	2	2	3	3	2	
		Set Goals, Targets, timeline, plan and execute activities of the project	2	2		3		2
		Disseminate work both in oral and written format.	-	2	2			2
		Avg	1.75	2	2.5	2.5	2	2
22254P41	PROJECT WORK PHASE II	Design and analyze, an identified problem using scientific tools and research	1	2		3	2	
		simulation/ Theoretical analysis of a physical system	2	2		1		
		Integrate various domain knowledge in carrying out experimental work and provide a sustainable solution.	2	2	3	3	2	
		Set Goals, Targets, timeline, plan and execute activities of the project	2	2		3		2
		Disseminate work both in oral and written format.	-	2	2			2

2		Avg		1.75	2	2.5	2.5	2	2

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
M.TECH - MANUFACTURING ENGINEERING- PART TIME (PG_2022)

COURSE CODE	COURSE TITLE	COURSE OUTCOMES	PO					
			1	2	3	4	5	6
22248S11EP	ADVANCED ENGINEERING MATHEMATICS	Analyze the performance in terms of probabilities and distributions achieved by the determined solutions.	2	-	-	-	-	2
		Be familiar with some of the commonly encountered two dimensional random variables and be equipped for a possible extension to multivariate analysis.	-	-	-	-	-	-
		Apply the basic principles underlying statistical inference(hypothesis testing).	2	-	-	-	1	2
		Demonstrate knowledge of applicable large sample theory of estimators and tests.	-	-	3	1	-	-
		Obtain a better understanding of the importance of the methods in modern industrial processes.	-	-	3	-	-	2
		Avg.	2	-	3	1	1	2
22254C12P	THEORY OF MACHINE CUTTING	Basics of orthogonal cutting, oblique cutting and chip formation	1	-	-	-	-	1
		Different tool materials, tool life and tool wear mechanisms	-	-	2	3	2	-
		Necessity for a cutting fluid and cutting efficiency	1	-	-	-	2	1
		Single and Multipoint cutting tools	-	-	-	-	-	2
		Effect of vibrations and surface roughness during machining	2	-	3	-	-	-
		Avg.	1.33	-	2.5	3	2	1.33
22254C13P	ADVANCED MANUFACTURING PROCESSES	Analyze the processes and evaluate the role of each process parameter during machining of various advanced materials.	1	-	-	-	-	-

		Understand requirements to achieve maximum material removal rate and best quality of machined surface while machining various industrial engineering materials.	-	-	-	-	2	-
		Analyze the different bulk metal forming process mechanics using different analysis	-	-	3	-	-	2
		Acquire the knowledge in mechanical micromachining processes.	1	-	-	-	2	-
		Demonstrate the knowledge of Additive Manufacturing and Rapid Prototyping Technologies	-	-	-	1	-	-
		Avg.	1	-	3	1	2	2
22254L14P	**CAD/CAM LABORATORY**	Interpret mechanical drawings for components, assemblies and use parametric 3D CAD software tools in the correct manner for creating their geometric part models, assemblies and automated drawings.	1	-	-	-	2	1
		Apply the concepts of machining for the purpose of selection of appropriate machining centres, machining parameters, select appropriate cutting tools for CNC milling and turning equipment, set-up, program, and operate CNC milling and turning equipment.	-	-	-	3	2	1
		Create and validate NC part program data using manual data input (MDI) and automatically using standard commercial CAM package for manufacturing of required component using CNC milling or turning applications.	-	-	-	-	2	1
		Produce an industrial component by interpreting 3D part model/ part drawings using Computer Aided Manufacturing technology through programming, setup, and ensuring safe operation of Computer Numerical Control (CNC) machine tools.	-	2	-	2	3	-
		Create and demonstrate the technical documentation for design/ selection of suitable drive technologies, precision components and an overall CNC machine tool system for automation of machining operations using appropriate multi-axis CNC technology.	-	-	-	-	-	2
		Avg.	1	2	-	2.5	2.25	1.25
22254C21P	**TOOLING FOR MANUFACTURING**	At the end of this course the students will be expected to introduce the various optimization techniques and their advancements.	2	-	-	3	2	-
		Ability to go in research by applying optimization techniques in problems of Engineering and Technology	1	-	-	2	3	-
		Use classical optimization techniques and numerical methods of optimization.	1	-	-	2	2	-
		Describe the basics of different evolutionary algorithms	-	2	-	-	-	-

Course Code	Course Name	Course Outcome						
		Ability to solve the mathematical results and numerical techniques of optimization theory to concrete Engineering problems by using computer software	1	-	-	3	-	2
		Avg.	1.25	2	-	2.5	2.33	2
22254C22P	MEMS AND NANO TECHNOLOGY	Realise the need of micro electromechanical systems.	1	-	-	2	-	1
		Develop a knowledge to select a sensor for an application	1	-	-	2	2	-
		Develop a nano material	-	-	3	2	-	-
		characterize the Nano material	-	-	3	2	-	-
		Develop an Electromechanical systems	-	-	-	2	2	2
		Avg	1	-	3	2	2	1.5
22254E23BP	LEAN MANUFACTURING	To know the necessity for a Lean Manufacturing system	1	-	-	-	-	-
		To Differentiate between the conventional Mass production system with Lean system	-	1	3	-	1	-
		In effectively implement the principles of JIT	-	-	3	-	-	-
		To apply the Inspection tools effectively in the Lean systems	1	-	-	2	-	1
		To apply Hoshin planning system to create a Lean culture in Industry	1	2	-	-	2	2
		Avg.	1	1.5	3	2	1.5	1.5
22254L24P	AUTOMATION LAB	To impart practical knowledge on bulk metal forming processes	-	2	1	2	-	-
		Know various symbols used in Hydraulic and Pneumatic circuits	-	2	-	2	-	-
		Conduct few sheet metals forming processes and analyse the parameters	-	2	-	-	3	1
		Design hydraulic circuits for industrial applications	-	2	-	-	2	1
		Learnt how to use automation studio	-	2	-	-	2	1
		Avg.	-	2	1	2	2.33	1
222TECWRP	TECHNICAL WRITING/SEMINAR	To develop skills to search, read, write, comprehend and present research papers in the areas of manufacturing engineering.	1	1	-	-	2	-
		Updated with the latest technology in the field of Manufacturing Engineering	1	2	3	-	2	-
		Able to plot graph, sketch, bring out the visual about his understanding on various topics	1	2	3	-	2	-

Course Code	Course Name	Course Outcome						
		Avg.	1	1.66	3	-	2	-
22254C31P	**ADVANCES IN CASTING & WELDING**	At the end of this course the students are expected to impart knowledge on basic concepts and advances in casting and welding processes.	1	-	-	-	-	1
		Know and perform solid state and special welding processes.	-	-	2	3	2	-
		Understand and analyze the material structures after welding.	1	-	-	-	2	1
		Design the weldments for various materials.	-	-	-	-	-	2
		Attain the knowledge about various welding defects and inspection methods.	2	-	3	-	-	-
		Avg.	**1.33**	**-**	**2.5**	**3**	**2**	**1.33**
22254C32P	**AUTOMATED COMPUTER INTEGRATED MANUFACTURING SYSTEMS**	Recognize the importance of CAD, CAM, CIM, Engineering product specification and interpreting geometric specifications.	-	-	-	2	2	-
		Improve knowledge on the integration of CAD and CAM.	-	-	-	-	2	1
		Exhibit competency in manual part program and generation of CNC part program using CAM packages.	1	2	-	3	-	-
		Describe the implementation of CAD and CAM in manufacturing processes.	2	-	-	-	1	2
		Explain applications of IOT in computer aided manufacturing.	-	-	-	-	3	1
		Avg.	1.5	2	-	2.5	2	1.33
22254E33CP	**MANUFACTURING INFORMATION SYSTEMS**	Able to acquire knowledge on facility, and problems associated with it.	2	1			1	
		Ability to learn the various capacity and layout planning models	2	1			1	
		Understand the concepts of demand forecasting and project management with relevant case studies.	2	1			1	
		Able to understand the concepts of production planning and scheduling.	2	1				
		Understand the various inventory and maintenance management techniques.	2	1				

Course Code	Course Name	Course Outcome	(10/5)=2	(5/5)=1			(3/3)=1	
		Avg						
22254C41P	**MANUFACTURING METROLOGY AND QUALITY CONTROL**	Understand the advanced measurement principles with ease.	1	-	-	1	1	-
		Operate sophisticated and accurate measuring instruments.	1	-	-	1	-	2
		Understand the various inspection methods and tools	1	-	3	-	2	1
		Design and develop new measuring methods.	1	-	-	1	2	1
		Apply computers in Measurement	-	-	-	1	2	1
		Avg.	1	-	3	1	1.75	1.25
22254C42P	**METAL FORMING PROCESS**	At the end of this course the students are expected to upgrade their knowledge on various metal forming techniques and formability	-	-	-	-	-	-
		Apply the theory of plasticity for various types of metal forming process.	1	-	-	-	-	-
		Apply the concept of powder metallurgy to make prismatic components	1	-	-	2	1	2
		Understand Non-traditional forming processes.	1	-	2	2	-	-
		Understand the purpose of surface treatment in metal forming applications	-	-	1	-	2	3
		Avg.	1	-	1.5	2	1.5	2.5
22254E43BP	**MAINTENANCE MANAGEMENT**	An understanding of sustainability management as an approach to aid in evaluating and minimizing environmental impacts while achieving the expected social impact.	3	3	2	1	2	2
		An understanding of corporate sustainability and responsible Business Practices	3	2	2	2	1	2
		Knowledge and skills to understand, to measure and interpret sustainability performances	3	3	1	2	2	3
		Knowledge of innovative practices in sustainable business and community management	3	3	2	1	1	2
		Deep understanding of sustainable management of resources and commodities	3	3	2	1	2	2
22254P44P	**PROJECT WORK PHASE I**	Design and analyze, an identified problem using scientific tools	1	2		3	2	

Code	Course	Outcome						
		Simulation/ Theoretical analysis of a physical system	2	2		1		
		Integrate various domain knowledge for a sustainable solution.	2	2	3	3	2	
		Set Goals, Targets, timeline, plan and execute activities of the project	2	2		3		2
		Disseminate work both in oral and written format**.**	-	2	2			2
		Avg	1.75	2	2.5	2.5	2	2
22254E51A P	**PROCESS PLANNING AND COST ESTIMATION**	Explain the concept of selection and steps in process planning, tooling,equipment selection and material evaluation	1	-	2	-	-	1
		Calculate process parameters and select Jig, Fixtures and quality assurance methods	2	-	-	3	-	2
		Apply the methods of costing and to explain the concept of estimation.	-	1	2	-	-	-
		Compute the cost of the product in various shops of production.	1	-	3	2	1	2
		Calculate the machining time for various operation	1	1	-	3	-	3
		Avg.	1.66	1	2.33	2.66	1	2
22254E52A P	**PRODUCT DESIGN AND DEVELOPMENT**	Identify the need for a New Product	2	-	-	3	-	1
		design and develop various products	1	-	3	1	1	1
		Work out the cost of developing a product	-	-	-	2	2	1
		Will be able to prototype the product	1	-	3	3	2	1
		Know how to patent the new design or the product	1	-	-	-	2	2
		Avg.	1.25	-	3	2.25	1.75	1.2
22254E53BP	**INDUSTRIAL SAFETY**	Expected to gain knowledge and skills needed to run an industry with utmost safety precautions.	1	-	-	2	1	1
		Understand the industrial laws, regulations and source models.	-	-	3	2	1	-
		Apply the methods of prevention of fire and explosions.	1	1	-	2	2	2
		Analyse the effect of release of toxic substances	1	1	-	2	-	2
		Understand the methods of hazard identification and preventive measures.	-	1	-	2	1	2
		Avg.	1	1	3	2	1.25	1.75
22254P61P	**PROJECT WORK PHASE II**	Design and analyze, an identified problem using scientific tools and research	1	2		3	2	

simulation/ Theoretical analysis of a physical system	2	2		1		
Integrate various domain knowledge in carrying out experimental work and provide a sustainable solution.	2	2	3	3	2	
Set Goals, Targets, timeline, plan and execute activities of the project	2	2		3		2
Disseminate work both in oral and written format.	-	2	2			2
Avg	1.75	2	2.5	2.5	2	2

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

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