

M.Tech Production Engineering Course Outcomes

<u>Core Subjects</u>		
Subject Code	Subject Title	Course Outcomes
MTPE-501	Metal Casting	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand and apply the principles of metal casting processes and develop analytical relation between input and output process parameters. 2. Understand, analyze and apply the concept of cooling rate of materials in metal casting. 3. Apply theoretical and experimental techniques for measurement of important outcomes of casting processes like hardness, dimensional accuracy etc. 4. Understand the model of casting economics and optimization and its measurement. 5. Apply the fundamentals of physics to develop theoretical relations for different types of casting processes.
MTPE-502	Metal Cutting	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand and apply the principles of mechanics to metal cutting process and develop analytical relation between input and output process parameters. 2. Understand, analyze and apply the concept of shear deformation of materials in metal cutting. 3. Apply theoretical and experimental techniques for measurement of important outcomes of metal cutting process like cutting forces, tool tip temperature 4. Understand the models of the machining economics and optimization, tool wear and its measurement. 5. Apply the fundamentals of abrasive machining to develop theoretical relations for different types of grinding and honing operations.
MTPE-503	Metal Forming	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand and apply the mechanism of deformation for different metal forming processes and develop analytical relation between input and output parameters of process. 2. Understand and analyze the concept of yield criteria applicable to different material deformation processes. 3. Apply theoretical and experimental techniques for measurement of important outcomes of metal forming processes. 4. Understand the different lubrication

		<p>mechanisms, lubricants and other valuable affecting the metal forming processes under different working conditions</p> <p>5. Understand the different types of defects, causes and apply their remedial measures in metal forming processes.</p>
MTPE-504	Welding Technology	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. The metallurgical changes exist in weld metal and its effect on properties. 2. The purpose and classification of coating of the electrodes 3. The various types of modes of metal transfer exist in welding processes. 4. Understand metallurgical changes in the weld metal and its effect on material properties. 5. Explain the metal transfer process during welding and power resources used for welding.
MTPE-505	Computer Aided Design & Manufacturing	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Describe the role of computer system in design and manufacturing. 2. Understand geometric models, techniques geometric modeling and apply various transformations with underline mathematics (Matrices and determinants). 3. Describe the key concept of NC/CNC/DNC and part programming to establish FMS. 4. Conceptualize the integration of CAD/CAM and business aspects in an industry. 5. Conceptualize and apply mathematical representation for solution of curves, solids and surfaces in design and engineering applications.
MTPE-506	Non-Conventional Machining Processes	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand the evolution, classification and need of nontraditional machining technology in modern manufacturing. 2. Understand and demonstrate the process principle and physical description; understand the parametric effect on process performance; solve problems related to process modeling, selection and material removal mechanics of mechanical energy based processes. 3. Understand and demonstrate the process principle and physical description; understand the parametric effect on process performance; solve problems related to process modeling, selection and material removal mechanics of thermal and

		<p>electro-thermal energy based processes.</p> <ol style="list-style-type: none">4. Understand and demonstrate the process principle and physical description; understand the parametric effect on process performance; solve problems related to process modeling, selection and material removal mechanics of chemical and electro-chemical energy based processes.5. Latest developments in the applications of nontraditional hybrid machining processes.
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Program Elective Subjects

Subject Code	Subject Title	Course Outcomes
MTPE-601	Jigs Fixtures & Die Design	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. List and use the general principles involve in jigs fixtures and die design. 2. Demonstrate the application of basic principles concerning the design of general jigs and fixtures, as well as dies and punches for manufacturing processes. 3. Apply the basic principles in designing universal and transfer lines jigs and fixtures for various manufacturing processes. 4. Assess the performance of a given tool design for meeting the specific design criteria. 5. Design and fabricate progressive, compound and combinations dies according to the requirements of Industries.
MTPE-602	Production Planning & Control	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Describe and analyze distinct concepts within production planning and explain how these can be used to plan and control the physical flow of information and products in the production companies. 2. Know about business forecasting and market survey in the dynamic environment. 3. Schedule production by using different techniques and evaluate different capacity alternatives/strategies to meet the customer demand. 4. Know about inventory control techniques and evaluate different inventory alternatives/ strategies. 5. Demonstrate and apply the concept of Material purchasing.
MTPE-603	Machine Tool Design	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand the concept of machine tool design. 2. Understand the concept of mechanism of stepped and step-less drives. 3. Understand the laws of spindle, bed, column and guide/slide ways design. 4. Understand the mechanism of adaptive control and man machine system in machine tool design. 5. Apply these principles in the design of different types of kinematic structures.

MTPE-604	Cutting Tool Design	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand the tool geometry, tool material, tool life and system of nomenclature (National and International). 2. Understand the design of single point cutting tool, high production tool and carbide tools for enhancing the productivity. 3. Able to design, re-sharp form tools and twists drills as per industrial requirements. 4. Design and analyze profile and form relieved milling cutters. 5. Apply theoretical and experimental techniques for designing hobs, broaches and numerical controlled tools.
MTPE-605	Industrial Tribology	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand the mechanism of friction, wear and lubrication and can develop analytical relation between the variables. 2. Understand the concept of types of wear and their measurement under different environments. 3. Understand the laws and mechanism of sliding and rolling friction and their measurements. 4. Understand the mechanism of lubrication, their performance w.r.t. different variables. Role of lubricants and their applications. 5. Apply these mechanisms of tribology in the design of different types of bearings considering various input and output parameters.
MTPE-606	Diagnostic Maintenance & Monitoring	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand and apply the principles of diagnostic techniques for planning of maintenance activities. 2. Understand, analyze and apply the concept of replacement analysis in plant maintenance. 3. Apply theoretical and experimental techniques for the measurement of maintenance efforts in the industrial environment. 4. Understand the model of maintenance and their applications in field environment. 5. Apply theoretical and experimental techniques for the measurement of maintenance efforts in the industrial environment.
MTPE-607	Advanced Operation research	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. The students are able to understand the role and origin of quantitative methods and operations

		<p>research technique.</p> <ol style="list-style-type: none"> 2. The students are able to differentiate between different types of deterministic and probabilistic models. 3. The students are expected to apply the various types of deterministic and probabilistic models in complex manufacturing system for taking better decisions. 4. In this highly competitive world, the students can plan all the projects in the real life on the basis of different phases of operation research. 5. Analyzes and evaluate the complex problems of Linear and nonlinear Programming by using different mathematical modeling for achieving the profits to organizations.
MTPE-608	Management of Production Systems	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Explain how the production system, have strategic importance and can provide a competitive advantage in the workplace. 2. Demonstrate the relationship between operations and other business functions. 3. Explain the Behavioral Aspects in production systems. 4. Apply the concepts of Program Management in an industrial organization. 5. Explain the Management Cybernetics function starting from Demand Management through Inventory Management.
MTPE-609	Simulation of Industrial Systems	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Access, analyze the various business, industry and defense problems on the basis of managerial decision making. 2. Structure any real-life situation into a mathematical model 3. Analyze the essential elements so that a solution relevant to the decision maker's objective can be sought. 4. Analyze and design Monte carlo and discrete event simulation. 5. Explain simulation in inventory and queuing system.
MTPE-610	Materials Technology	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Suggest, select and use different structural materials for various engineering applications based on their properties for best performance under the specified conditions. 2. Specify property degradation and different

		<p>modes of failure of materials during their application in different working environments and can suggest suitable surface modification techniques.</p> <ol style="list-style-type: none"> 3. Use nondestructive testing techniques for flaw detection in materials. 4. Explain the use and significance of various heat treatment processes and their applications for different materials. 5. Understand the structural changes in metals with respect to time temperature transformations.
MTPE-611	Mechatronics	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Identify the key elements of mechatronics system and its representation in terms of block diagram 2. Understand the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O 3. Apply the interfacing of Sensors, Actuators using appropriate DAQ micro-controller in real life problems 4. Develop PLC ladder programming and implementation of real life system. 5. Be able to integrate mechanical, electronics, control and computer engineering in the design of mechatronics systems.
MTPE-612	Robotics & Industrial Automation	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand and application of basic concept of robot configuration, manipulator, actuator and transmission system. 2. Identify sensors and actuators required for specific applications. 3. Understand programming principles for robot control. 4. Apply the basic principles for designing automated handling systems. 5. Able to design pneumatic and hydraulic cylinders with respect to control valves and control circuits.
MTPE-613	Metrology & Industrial Inspection	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Use various standards of measurement and limits fits and tolerances. 2. Calibrate, and adjust measuring and test equipment.

		<ol style="list-style-type: none"> 3. Explain the concept of interferometry and its applications. 4. Measure and testing of different types of gears and threads using various techniques. 5. Explain how metrology impacts industry by providing a description of the hierarchy of measurement primary standards in our world.
MTPE-614	Computer Aided Process Planning	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand & explain the difference between traditional and computer aided process planning. 2. Apply group technology wherever required. 3. Elaborate production systems at operation and plant level. 4. Explain different aspects of automated process planning. 5. Gain the knowledge of artificial intelligence and able to apply AI for production systems. Apply various generative process planning systems and their advantages.
MTPE-615	Methods Engineering & Ergonomics	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Demonstrates the role of work study, to improve productivity of an industrial system. 2. Explain the work measurement, wage incentive plans and methods of time measurement. 3. Demonstrate the effect of work load on humans. 4. Demonstrate the role of ergonomics for the design of safe Man-Machine system. 5. Explain the ill effects of climatic conditions, vibrations and noise on the human body.
MTPE-616	Product design & development	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand the need and concept of product design and development in industry. 2. Demonstrate the use of ergonomics and concepts of visual design in designing and developing the product in an industry or for research work. 3. Implement the use of materials, forms, function, color relationships and packaging materials in product graphics, product development and testing during actual production system. 4. Use the knowledge of value engineering, its techniques and value control while designing

		<p>and developing product in an industrial environment or for research work.</p> <p>5. Translate the concepts of economics in design, optimization of design and human factors approach to product design.</p>
MTPE-617	Entrepreneurship	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand the function of the entrepreneur in the successful, commercial application of innovations. identify personal attributes that enable best use of entrepreneurial opportunities. 2. Demonstrate knowledge of the legal and ethical environment impacting business organizations and exhibit an understanding and appreciation of the ethical implications of decisions. 3. Demonstrate an understanding of and appreciation for the importance of the impact of globalization and diversity in modern organizations. 4. Demonstrate an ability to engage in critical thinking by analyzing situations and constructing and selecting viable solutions to solve problems. 5. Demonstrate knowledge of current information, theories and models, and techniques and practices in all of the major business disciplines including the general areas of Accounting and Finance, Information Technologies, Management, Marketing, and Quantitative Analysis.
MTPE-618	Statistics & Reliability Engineering	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Apply the knowledge of Sampling Theory in daily life problems 2. Apply the knowledge of ANOVA in solving statistical problems 3. Check the solutions by using Hypothesis method 4. Apply Monte-Carlo Method in practical experimentations 5. Apply the knowledge of reliability engineering to find the solutions of industrial problems.
MTIE-601	Research Methodology	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand research problem formulation. 2. Analyze research related information & research ethics. 3. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 4. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasize the need of information about Intellectual Property Right to be

		<p>promoted among students in general & engineering in particular.</p> <p>5. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.</p>
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Open Elective Subjects

Subject Code	Subject Title	Course Outcomes
MTPE-607	Advanced Operation Research	<p>Students will be able to:</p> <ol style="list-style-type: none">1. The students are able to understand the role and origin of quantitative methods and operations research technique.2. The students are able to differentiate between different types of deterministic and probabilistic models.3. The students are expected to apply the various types of deterministic and probabilistic models in complex manufacturing system for taking better decisions.4. In this highly competitive world, the students can plan all the projects in the real life on the basis of different phases of operation research.5. Analyzes and evaluate the complex problems of Linear and nonlinear Programming by using different mathematical modeling for achieving the profits to organizations.
MTPE-610	Materials Technology	<p>Students will be able to:</p> <ol style="list-style-type: none">1. Suggest, select and use different structural materials for various engineering applications based on their properties for best performance under the specified conditions.2. Specify property degradation and different modes of failure of materials during their application in different working environments and can suggest suitable surface modification techniques.3. Use nondestructive testing techniques for flaw detection in materials.4. Explain the use and significance of various heat treatment processes and their applications for different materials.5. Understand the structural changes in metals with respect to time temperature transformations.
MTPE-615	Methods Engineering & Ergonomics	<p>Students will be able to:</p> <ol style="list-style-type: none">1. Demonstrates the role of work study, to improve productivity of an industrial system.2. Explain the work measurement, wage incentive plans and methods of time measurement.3. Demonstrate the effect of work load on humans.4. Demonstrate the role of ergonomics for the design of safe Man-Machine system.

		<p>5. Explain the ill effects of climatic conditions, vibrations and noise on the human body.</p>
MTPE-617	Entrepreneurship	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Understand the function of the entrepreneur in the successful, commercial application of innovations. identify personal attributes that enable best use of entrepreneurial opportunities. 2. Demonstrate knowledge of the legal and ethical environment impacting business organizations and exhibit an understanding and appreciation of the ethical implications of decisions. 3. Demonstrate an understanding of and appreciation for the importance of the impact of globalization and diversity in modern organizations. 4. Demonstrate an ability to engage in critical thinking by analyzing situations and constructing and selecting viable solutions to solve problems. 5. Demonstrate knowledge of current information, theories and models, and techniques and practices in all of the major business disciplines including the general areas of Accounting and Finance, Information Technologies, Management, Marketing, and Quantitative Analysis.
MTPE-618	Statistics & Reliability Engineering	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. Apply the knowledge of Sampling Theory in daily life problems 2. Apply the knowledge of ANOVA in solving statistical problems 3. Check the solutions by using Hypothesis method 4. Apply Monte-Carlo Method in practical experimentations. 5. Apply the knowledge of reliability engineering to find the solutions of industrial problems.