M.Tech. Production Engineering Syllabus

Subject Code	Subject Title	Course Outcomes
MTPE-501	Metal Casting	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	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	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 mechanisms, lubricants and other valuable affecting the metal forming processes under different working conditions 5. Understand the different types of defects, causes and apply their remedial measures in metal forming processes.
MTPE-504	Welding Technology	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. The difference between various welding processes and its industrial utilization.
MTPE-505	Computer Aided Design & Manufacturing	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.
MTPE-506	Non-Conventional Machining Processes	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 electro-thermal energy based processes. 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.
MTPE-601	Jigs Fixtures & Die Design	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.
MTPE-602	Production Planning & Control	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. Schedule production by using different techniques and evaluate different capacity alternatives/strategies to meet the customer demand. 3. Know about inventory control techniques and other concepts such JIT and value engineering.
MTPE-603	Machine Tool Design	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-605	Industrial Tribology	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	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.
MTPE-607	Advanced Operation research	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 ad 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.
MTPE-609	Simulation of Industrial Systems	1. Course provides an introduction to system modeling using computer simulation. 2. Analyze and design Monte carlo and discrete-event simulation. 3. Need of simulation in inventory and queuing system.
MTPE-610	Materials Technology	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.
MTPE-612	Robotics & Industrial Automation	1. Understand and application of basic concept of robot configuration, manipulator, actuator and transmission system. 2. Indentify sensors and actuators required for specific applications. 3. Understand programming principles for robot control. 4. Apply the basic principles for designing automated handling systems.
MTPE-614	Computer Aided Process Planning	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.
MTPE-615	Methods Engineering & Ergonomics	1. Demonstrates the role of work study, to improve productivity of an industrial system. 2. Understand about the work measurement, wage incentive plans and methods of time measurement. 3. Know about the role of ergonomics for the design of safe Man-Machine system. 4. Describe the ill effects of climatic conditions, vibrations and noise on the human body.
MTPE-616	Product design &development	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 and developing product in an industrial environment or for research work.