



# **Kathir College of Engineering**

[Approved by AICTE | Affiliated to Anna University | Accredited by NAAC]  
Wisdom Tree, Neelambur, Avinashi Road, Coimbatore-62

# **MANUFACTURING TECHNOLOGY**



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## Regulation – 2021 - PG

### M.E. – MANUFACTURING ENGINEERING

YEAR/SEMESTER : I/I	
S.No	Course Outcome
<b>C101/ MA4155-APPLIED PROBABILITY AND STATISTICS FOR MANUFACTURING ENGINEERING</b>	
<b>C101.1</b>	Analyze the performance in terms of probabilities and distributions achieved by the determined solutions.
<b>C101.2</b>	Be familiar with some of the commonly encountered two dimensional random variables and be equipped for a possible extension to multivariate analysis.
<b>C101.3</b>	Apply the basic principles underlying statistical inference(hypothesis testing).
<b>C101.4</b>	Demonstrate knowledge of applicable large sample theory of estimators and tests.
<b>C101.5</b>	Obtain a better understanding of the importance of the methods in modern industrial processes.
<b>C102/MF4101-ADVANCES IN MANUFACTURING PROCESS</b>	
<b>C102.1</b>	Analyze the processes and evaluate the role of each process parameter during machining of various advanced materials.
<b>C102.2</b>	Understand requirements to achieve maximum material removal rate and best quality of machined surface while machining various industrial engineering materials.
<b>C102.3</b>	Analyze the different bulk metal forming process mechanics using different analysis
<b>C102.4</b>	Acquire the knowledge in mechanical micromachining processes.
<b>C102.5</b>	Demonstrate the knowledge of Additive Manufacturing and Rapid Prototyping Technologies
<b>C103/MF4102 - ADVANCES IN CASTING &amp; WELDING</b>	
<b>C103.1</b>	To impart knowledge on basic concepts and advances in casting and welding processes.



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<b>C103.2</b>	Know and perform solid state and special welding processes.
<b>C103.3</b>	Understand and analyze the material structures after welding.
<b>C103.4</b>	Design the weldments for various materials.
<b>C103.5</b>	Attain the knowledge about various welding defects and inspection methods.
<b>C104/MF4103- THEORY OF METAL CUTTING</b>	
<b>C104.1</b>	Basics of orthogonal cutting, oblique cutting and chip formation
<b>C104.2</b>	Different tool materials, tool life and tool wear mechanisms
<b>C104.3</b>	Necessity for a cutting fluid and cutting efficiency
<b>C104.4</b>	Single and Multipoint cutting tools
<b>C104.5</b>	Effect of vibrations and surface roughness during machining
<b>C105/ CM4151-COMPUTER AIDED MANUFACTURING</b>	
<b>C105.1</b>	Recognize the importance of CAD, CAM, CIM, Engineering product specification and Interpreting geometric specifications.
<b>C105.2</b>	Improve knowledge on the integration of CAD and CAM.
<b>C105.3</b>	Exhibit competency in manual part program and generation of CNC part program using CAM packages.
<b>C105.4</b>	Describe the implementation of CAD and CAM in manufacturing processes.
<b>C105.5</b>	Explain applications of IOT in computer aided manufacturing.
<b>C106/ RM4151-RESEARCH METHODOLOGY AND IPR</b>	
<b>C106.1</b>	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
<b>C106.2</b>	Understand research problem formulation & Analyze research related information and Follow research ethics
<b>C106.3</b>	Correlate the results of any research article with other published results. Write a review article in the field of engineering.
<b>C106.4</b>	Appreciate the importance of IPR and protect their intellectual property. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits



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<b>C107/ MF4111-CAD/CAM LAB</b>	
<b>C107.1</b>	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.
<b>C107.2</b>	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.
<b>C107.3</b>	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.
<b>C107.4</b>	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.
<b>C107.5</b>	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.
<b>C108/ MF4112-TECHNICAL SEMINAR</b>	
<b>C108.1</b>	To develop skills to search, read, write, comprehend and present research papers in the areas of manufacturing engineering.
<b>C108.2</b>	Updated with the latest technology in the field of Manufacturing Engineering
<b>C108.3</b>	Able to plot graph, sketch, bring out the visual about his understanding on various topics
<b>YEAR/SEMESTER : I/II</b>	
<b>C201/MF5201- OPTIMIZATION TECHNIQUES IN MANUFACTURING</b>	
<b>C201.1</b>	The student has a basic understanding of the history of optimization problems, their formulation, classification, and solutions. application in a variety of engineering fields
<b>C201.2</b>	Ability to approach and solve linear equations in organizational research problems that apply to real-world engineering problems.
<b>C201.3</b>	Ability to approach and solve non-linear equations of operational research problems that are relevant to real-world engineering business problems.
<b>C201.4</b>	Ability to solve various experimental experiments using various optimization methods in order to achieve the best objective function value.



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C201.5	The student understands various simulation methods and how to apply them to various experimental experiments in order to achieve the best objective function value.
<b>C202/CM5251- ADVANCES IN METROLOGY AND INSPECTION</b>	
C202.1	Ability to comprehend metrology principles and measurement errors
C202.2	Understanding of the applications of surface roughness calculation
C202.3	Ability to comprehend the fundamentals of interferometer and its significance.
C202.4	Understanding of measurement devices and laser metrology
C202.5	Image processing capability for metrology
<b>C203/MF4203-THEORY OF METAL FORMING</b>	
C203.1	Knowledge on various metal forming techniques and formability.
C203.2	Apply the theory of plasticity for various types of metal forming process.
C203.3	Apply the concept of powder metallurgy to make prismatic components.
C203.4	Understand Non-traditional forming processes.
C203.5	Understand the purpose of surface treatment in metal forming applications.
<b>C204/MF4204- ADDITIVE MANUFACTURING</b>	
C204.1	Learn about a variety of Additive Manufacturing (AM) technologies.
C204.2	Describe additive manufacturing and explain its advantages and disadvantages
C204.3	Explain the processes used in additive manufacturing for a range of materials and applications
C204.4	Understand the role of additive manufacturing in the design process and their potential to support Design and manufacturing,
C204.5	Case studies relevant to mass customized manufacturing, and some of the important research challenges associated with AM and its data processing tools
<b>C205/ MF4205 FLUID POWER AUTOMATION</b>	
C205.1	Illustrate the areas of hydraulics, pneumatic and fluid power components and its functions.
C205.2	Recognize the standard symbols used in fluid power circuits and assess the suitable component for a particular application
C205.3	Construct the hydraulic circuits for an industrial application.
C205.4	Build a pneumatic circuit and apply them to real life problems.
C205.5	Design and develop a PLC controlled pneumatic circuit for industrial application



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<b>C206/MF4007-LEAN MANUFACTURING (Professional Elective-I)</b>	
<b>C206.1</b>	Know the necessity for a Lean Manufacturing system
<b>C206.2</b>	To Differentiate between the conventional Mass production system with Lean system
<b>C206.3</b>	In effectively implement the principles of JIT
<b>C206.4</b>	To apply the Inspection tools effectively in the Lean systems
<b>C206.5</b>	To apply Hoshin planning system to create a Lean culture in Industry
<b>C207/MF4004-MATERIALS MANAGEMENT (Professional Elective-II)</b>	
<b>C207.1</b>	Familiarized with the various concepts and functions of material management
<b>C207.2</b>	Able to handle the purchase and stores Independently
<b>C207.3</b>	Understand Logistics and inventory pricing
<b>C207.4</b>	Materials planning and periodic replenishment of material
<b>C207.5</b>	Just in time techniques and inventory management
<b>C208/MF4211-AUTOMATION AND METAL FORMING LABORATORY</b>	
<b>C208.1</b>	To impart practical knowledge on bulk metal forming processes
<b>C208.2</b>	Know various symbols used in Hydraulic and Pneumatic circuit
<b>C208.3</b>	Conduct few sheet metals forming processes and analyse the parameters
<b>C208.4</b>	Design hydraulic circuits for industrial applications
<b>C208.5</b>	Learnt how to use automation studio
<b>C209/MF4212-ADVANCED MANUFACTURING PROCESSES LABORATORY</b>	
<b>C209.1</b>	Perform modelling and simulation of manufacturing processes
<b>C209.2</b>	Analyze the process using an FEA package
<b>C209.3</b>	Competence to execute product development phases



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<b>C209.4</b>	Simple programming for robotic applications
<b>C209.5</b>	Use EDM/ECM for machining different materials

<b>YEAR/SEMESTER : II/III</b>	
<b>C301/MF4091-MANUFACTURING MANAGEMENT (Professional Elective-III)</b>	
<b>C301.1</b>	Able to acquire knowledge on facility, and problems associated with it.
<b>C301.2</b>	Ability to learn the various capacity and layout planning models
<b>C301.3</b>	Understand the concepts of demand forecasting and project management with relevant case studies.
<b>C301.4</b>	Able to understand the concepts of production planning and scheduling.
<b>C301.5</b>	Understand the various inventory and maintenance management techniques.
<b>C302/MF4016- ENTREPRENEURSHIP DEVELOPMENT(Professional Elective-IV)</b>	
<b>C302.1</b>	Gain knowledge and skills needed to run a business.
<b>C302.2</b>	Innovate and solve challenges in business
<b>C302.3</b>	Determine risks in the trade and respond effectively
<b>C302.4</b>	Utilize tools and develop strategies to manage business
<b>C302.5</b>	Establish start-ups and Evaluate the business
<b>C303/MF4020-INDUSTRIAL SAFETY (Professional Elective-V)</b>	
<b>C303.1</b>	Expected to gain knowledge and skills needed to run an industry with utmost safety precautions.
<b>C303.2</b>	Understand the industrial laws, regulations and source models.
<b>C303.3</b>	Apply the methods of prevention of fire and explosions.
<b>C303.4</b>	Analyse the effect of release of toxic substances
<b>C303.5</b>	Understand the methods of hazard identification and preventive measures.



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<b>C304/ OME432 -Energy Conservation and Management in Domestic Sectors (OPEN ELECTIVE)</b>	
<b>C304.1</b>	Understand technical aspects of energy conservation scenario.
<b>C304.2</b>	Energy audit in any type for domestic buildings and suggest the conservation measures.
<b>C304.3</b>	Perform building load estimates and design the energy efficient landscape system.
<b>C304.4</b>	Gain knowledge to utilize an appliance/device sustainably.
<b>C304.5</b>	Understand the status and current technological advancement in energy storage field.
<b>C305/MF4311-PROJECT PHASE - I</b>	
<b>C305.1</b>	Design and analyze, an identified problem using scientific tools
<b>C305.2</b>	Simulation/ Theoretical analysis of a physical system
<b>C305.3</b>	Integrate various domain knowledge for a sustainable solution.
<b>C305.4</b>	Set Goals, Targets, timeline, plan and execute activities of the project
<b>C305.5</b>	Disseminate work both in oral and written format.
<b>YEAR/SEMESTER : II/IV</b>	
<b>C401/MF4411-PROJECT PHASE - II</b>	
<b>C401.1</b>	Design and analyze, an identified problem using scientific tools and research simulation/ theoretical analysis of a physical system
<b>C402.2</b>	Simulation/ Theoretical analysis of a physical system
<b>C403.3</b>	Integrate various domain knowledge in carrying out experimental work and provide a sustainable solution.
<b>C404.4</b>	Set Goals, Targets, timeline, plan and execute activities of the project
<b>C405.5</b>	Disseminate work both in oral and written format.