**INSTITUTE OF ENGINEERING**

**DEPARTMENT OF MECHANICAL ENGINEERING**

**COURSE OUTCOMES**

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| **S No** | **Class & Semester** | **Course & Course Code** | **COs** | **Course Outcomes** |
|  | M.Tech. I Semester | MME6101T - Forming Processes & Analysis | CO1 | Analyze various forming processes in terms of their applicability and limitations. |
| CO2 | Evaluate the performance of forming processes based on material properties and process parameters. |
| CO3 | Apply theoretical knowledge to optimize forming processes for enhanced product quality. |
| CO4 | Design experiments and interpret results to optimize forming operations. |
| CO5 | Develop skills in problem-solving related to forming processes in industrial applications. |
|  | M.Tech I Semester | MME6102T - Cutting Processes & Analysis | CO1 | Demonstrate proficiency in analyzing different cutting processes and their applications. |
| CO2 | Apply mathematical models to predict cutting forces and tool wear in machining operations. |
| CO3 | Evaluate the influence of cutting parameters on surface integrity and machining accuracy. |
| CO4 | Design cutting tools and machining strategies for complex geometries and materials. |
| CO5 | Synthesize knowledge to optimize cutting processes for improved productivity and sustainability. |
|  | M.Tech I Semester | MME6103T - Welding Processes | CO1 | Analyze various welding techniques and their suitability for different materials and applications. |
| CO2 | Evaluate weld quality and performance using non-destructive testing methods. |
| CO3 | Design welding procedures to meet specific structural and material requirements. |
| CO4 | Troubleshoot welding defects and propose corrective measures for process improvement. |
| CO5 | Demonstrate proficiency in selecting appropriate welding techniques for industrial applications. |
|  | M.Tech I Semester | MME6106T - Industrial Metrology | CO1 | Describe the principles and techniques of dimensional metrology. |
| CO2 | Apply statistical methods to analyze measurement data and ensure accuracy in metrology processes. |
| CO3 | Evaluate the performance of measurement systems and recommend improvements. |
| CO4 | Design experiments to validate metrological performance and ensure compliance with industry standards. |
| CO5 | Develop skills in using advanced metrology tools and software for precision engineering applications. |
|  | M.Tech I Semester | MLC6101T - Research Methodology and IPR | CO1 | Define research problems and formulate research objectives using appropriate methodologies. |
| CO2 | Apply ethical principles and intellectual property rights (IPR) regulations in research practices. |
| CO3 | Analyze research literature and synthesize findings to support research hypotheses. |
| CO4 | Design research experiments and methodologies suitable for mechanical engineering applications. |
| CO5 | Communicate research findings effectively through technical reports and presentations. |
|  | M.Tech I Semester | MME6101P - Cutting Processes & Analysis (Lab) | CO1 | Demonstrate hands-on proficiency in operating cutting tools and equipment safely. |
| CO2 | Apply cutting theories to measure and analyze cutting forces in practical scenarios. |
| CO3 | Evaluate the effects of cutting parameters on surface finish and tool life. |
| CO4 | Design experiments to optimize cutting conditions for enhanced efficiency. |
| CO5 | Troubleshoot machining issues and suggest process improvements based on experimental data. |
|  | M.Tech I Semester | MME6102P - Welding Processes (Lab) | CO1 | Perform different welding operations following standard safety procedures. |
| CO2 | Analyze weld bead geometry and mechanical properties through practical tests. |
| CO3 | Evaluate common welding defects and implement corrective measures. |
| CO4 | Design simple welded joints considering mechanical and thermal constraints. |
| CO5 | Develop skills in using advanced welding equipment and inspection tools. |
|  | M.Tech I Semester | MTE6103T - Nuclear Engineering (Programme Elective-I) | CO1 | Explain the principles of nuclear reactions and reactor physics. |
| CO2 | Apply thermodynamic and heat transfer concepts to analyze nuclear power plant operations. |
| CO3 | Evaluate safety protocols and risk assessment strategies in nuclear facilities. |
| CO4 | Design basic reactor components considering efficiency and safety factors. |
| CO5 | Analyze the environmental impact and sustainability of nuclear energy systems. |
|  | M.Tech I Semester | MTE6104T - Energy Conservation and Management (Programme Elective-I) | CO1 | Describe energy conservation techniques and energy audit methodologies. |
| CO2 | Apply energy management principles to optimize industrial energy use. |
| CO3 | Evaluate energy efficiency improvement strategies in mechanical systems. |
| CO4 | Design sustainable energy systems considering environmental and economic factors. |
| CO5 | Analyze case studies on energy conservation projects and suggest improvements. |
|  | M.Tech I Semester | MTE6105T - Air Conditioning System Design (Programme Elective-II) | CO1 | Explain the fundamental principles of air conditioning and refrigeration systems. |
| CO2 | Apply thermodynamic cycles to analyze the performance of air conditioning systems. |
| CO3 | Evaluate the impact of system components on cooling load and energy efficiency. |
| CO4 | Design HVAC systems for residential and industrial applications considering environmental conditions. |
| CO5 | Develop strategies for energy-efficient air conditioning system design. |
|  | M.Tech I Semester | MTE6106T - Gas Turbines (Programme Elective-II) | CO1 | Describe the working principles and thermodynamic cycles of gas turbines. |
| CO2 | Apply fluid mechanics and heat transfer concepts to analyze gas turbine performance. |
| CO3 | Evaluate the efficiency and environmental impact of different gas turbine configurations. |
| CO4 | Design basic gas turbine components with considerations for performance optimization. |
| CO5 | Analyze failure mechanisms in gas turbines and propose maintenance strategies. |
|  | M.Tech I/ II Semester | AUD6101T - Disaster Management (Audit Course – I & II) | CO1 | Explain the fundamental concepts and phases of disaster management. |
| CO2 | Analyze the causes and impacts of natural and man-made disasters. |
| CO3 | Evaluate disaster risk reduction strategies and emergency response plans. |
| CO4 | Design community-based disaster management frameworks for resilience. |
| CO5 | Demonstrate the ability to develop disaster preparedness and mitigation plans. |
|  | M.Tech I/ II Semester | AUD6102T - English for Research Paper Writing (Audit Course – I & II) | CO1 | Identify the structure and components of a high-quality research paper. |
| CO2 | Apply academic writing techniques to draft clear and concise research papers. |
| CO3 | Evaluate research articles to identify strengths and areas for improvement. |
| CO4 | Demonstrate proficiency in referencing, citation styles, and avoiding plagiarism. |
| CO5 | Develop effective communication skills for presenting research findings. |
|  | M.Tech I/ II Semester | AUD6103T - Sanskrit for Technical Knowledge (Audit Course – I & II) | CO1 | Understand the basics of Sanskrit grammar and technical terminologies. |
| CO2 | Apply Sanskrit knowledge to comprehend ancient scientific texts. |
| CO3 | Analyze the contributions of Sanskrit literature to modern science and technology. |
| CO4 | Interpret technical terms and phrases in classical Sanskrit for academic purposes. |
| CO5 | Develop the ability to integrate Sanskrit knowledge into contemporary research contexts. |
|  | M.Tech I/ II Semester | AUD6104T - Value Education (Audit Course – I & II) | CO1 | Explain the fundamental concepts of value-based education and ethics. |
| CO2 | Analyze the role of values in personal and professional life. |
| CO3 | Apply ethical principles to real-life scenarios and decision-making processes. |
| CO4 | Evaluate the impact of cultural, social, and environmental values on society. |
| CO5 | Develop strategies for promoting ethical practices in personal and organizational contexts. |
|  | M.Tech I/ II Semester | AUD6105T - Constitution of India (Audit Course – I & II) | CO1 | Understand the key features, principles, and structure of the Indian Constitution. |
| CO2 | Analyze the roles and powers of the legislative, executive, and judiciary. |
| CO3 | Evaluate fundamental rights, duties, and directive principles in the context of civic responsibilities. |
| CO4 | Discuss the evolution and amendments of the Constitution in response to societal changes. |
| CO5 | Apply constitutional principles to real-life legal and ethical issues. |
|  | M.Tech I/ II Semester | AUD6106T - Pedagogy Studies (Audit Course – I & II) | CO1 | Explain the fundamental concepts and theories of pedagogy and learning. |
| CO2 | Analyze various teaching methods and their effectiveness in diverse learning environments. |
| CO3 | Apply pedagogical strategies to design effective learning experiences. |
| CO4 | Evaluate the impact of educational policies and practices on student learning outcomes. |
| CO5 | Develop critical thinking and reflective skills for continuous improvement in teaching practices. |
|  | M.Tech I/ II Semester | AUD6107T - Stress Management by Yoga (Audit Course – I & II) | CO1 | Understand the principles and practices of yoga for stress management. |
| CO2 | Analyze the physiological and psychological effects of stress and relaxation techniques. |
| CO3 | Apply yogic techniques to manage stress and promote mental well-being. |
| CO4 | Evaluate the effectiveness of yoga-based interventions in different contexts. |
| CO5 | Develop personal stress management plans integrating yoga practices. |
|  | M.Tech I/ II Semester | AUD6108T - Personality Development through Life Enlightenment Skills (Audit Course – I & II) | CO1 | Explain the principles of personality development and self-awareness. |
| CO2 | Analyze the role of emotional intelligence and communication skills in personal growth. |
| CO3 | Apply techniques for building confidence, leadership, and interpersonal skills. |
| CO4 | Evaluate personal strengths and areas for development through reflective practices. |
| CO5 | Develop strategies for continuous self-improvement and life-long learning. |
|  | M.Tech II Semester | Machine Tool Design (MME6201T) | CO1 | Apply the principles of machine tool design to develop innovative mechanical systems. |
| CO2 | Analyze the performance of machine components to optimize design efficiency. |
| CO3 | Evaluate different design methodologies for machine tools based on operational requirements. |
| CO4 | Create advanced machine tool models using modern engineering techniques. |
| CO5 | Understand the material behavior under different loading conditions. |
|  | M.Tech II Semester | Computer Aided Manufacturing (MME6202T) | CO1 | Demonstrate the use of CAM software for efficient manufacturing processes. |
| CO2 | Analyze the integration of CAM with CNC machines for enhanced productivity. |
| CO3 | Evaluate the effectiveness of different CAM strategies in product development. |
| CO4 | Design complex components using computer-aided tools. |
| CO5 | Explain the fundamentals of computer-aided manufacturing systems. |
|  | M.Tech II Semester | CAM & Robotics Lab (MME6201P) | CO1 | Apply CAM software for programming and simulating robotic movements. |
| CO2 | Analyze robotic systems for precision and efficiency in manufacturing tasks. |
| CO3 | Evaluate the performance of different robotic configurations. |
| CO4 | Design basic robotic applications for industrial automation. |
| CO5 | Understand the key concepts of robotics and automation systems. |
|  | M.Tech II Semester | Machine Tool Design Lab (MME6202P) | CO1 | Apply theoretical design principles in practical machine tool development. |
| CO2 | Analyze the structural integrity of machine components under load conditions. |
| CO3 | Evaluate machine tool performance based on experimental data. |
| CO4 | Develop machine tool prototypes using modern fabrication techniques. |
| CO5 | Understand practical challenges in machine tool design and suggest solutions. |
|  | M.Tech II Semester | Mini Project (MME6203S) | CO1 | Apply interdisciplinary knowledge to solve complex engineering problems. |
| CO2 | Analyze project requirements to develop effective solutions. |
| CO3 | Evaluate project outcomes based on defined objectives and constraints. |
| CO4 | Design innovative engineering solutions through project-based learning. |
| CO5 | Understand project management principles in engineering contexts. |
|  | M.Tech II Semester | Production Management (MME6203T) (Programme Elective-III) | CO1 | Apply production management techniques to improve manufacturing processes. |
| CO2 | Analyze production systems for efficiency and cost-effectiveness. |
| CO3 | Evaluate different production strategies based on performance metrics. |
| CO4 | Design production workflows to optimize resource utilization. |
| CO5 | Understand key concepts of production planning and control. |
|  | M.Tech II Semester | Manufacturing Strategies (MME6204T) (Programme Elective-III) | CO1 | Apply strategic management principles in manufacturing settings. |
| CO2 | Analyze manufacturing strategies for competitive advantage. |
| CO3 | Evaluate the effectiveness of different manufacturing approaches. |
| CO4 | Develop strategic plans for sustainable manufacturing operations. |
| CO5 | Understand global trends and their impact on manufacturing strategies. |
|  | M.Tech II Semester | Industrial Robotics (MME6205T) (Programme Elective-IV) | CO1 | Apply robotics principles to automate industrial processes. |
| CO2 | Analyze robotic kinematics and dynamics for various applications. |
| CO3 | Evaluate the performance of robotic systems in manufacturing environments. |
| CO4 | Design robotic solutions for complex industrial tasks. |
| CO5 | Understand the fundamentals of industrial robotics and automation. |
|  | M.Tech II Semester | Mechatronics (MME6206T) (Programme Elective-IV) | CO1 | Apply mechatronics principles to integrate mechanical and electronic systems. |
| CO2 | Analyze the interaction between mechanical, electronic, and control systems. |
| CO3 | Evaluate mechatronic systems for performance and reliability. |
| CO4 | Design innovative mechatronic devices for real-world applications. |
| CO5 | Understand the key concepts of sensors, actuators, and control systems in mechatronics. |