# Mechanical Engineering Department

**VISION:**

- To be a Mechanical Engineering Program of the first choice by the aspiring students and prospective employers by implementing world class education practices.

**MISSION**:

- To adopt vibrant academic curricula and implementing innovative teaching learning processes.
- To provide opportunities to the students for the development of professional skills.
- To Nurture critical thinking and creativity in students.
- To Inculcate in students the life-long learning attitude and sensitivity towards society and environment.

**Objective:**

- To prepare the students to excel in postgraduate programs or to succeed in industry/technical profession through global, rigorous Mechanical Engineering education.
- To provide students with a sound foundation in Mathematics, Core Sciences and Mechanical Engineering fundamentals required to solve the problems in the field of Mechanical Engineering.
- To train the students with good scientific and engineering breadth so as to comprehend, analyse, design and create novel products and give solutions for the real life problems.
- To inculcate in students professional, ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and ability to relate engineering issues to broader social context.
- To provide students with an academic environment for excellence, leadership, managerial skills, written ethical codes and guidelines and lifelong learning needed for successful professional career.
- To develop creativity, innovative ability and R&D culture to build new sustainable mechanisms, machines, systems and methodology for enhancing engineering and technology standards.

# Undergraduate Program in Mechanical Engineering

**Program Educational Objectives (PEO's)**

PEO1: Demonstrate technical competency by applying knowledge to solve problems related to engineering issues.

PEO2: Exhibit skills and appropriate attitude to succeed in their professional career.

PEO3: Display thirst for emerging technologies and quest for innovation with concern to society and environment.

**PROGRAM OUTCOMES**

Engineering Graduates will be able to:

PO 1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 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.

PO 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.

PO 5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 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.

PO 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.

PO 8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 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.

PO 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.

PO 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)**

(PSO-1) Students will develop an ability to successfully apply the design, thermal and manufacturing principles to analyze and interpret the problems of mechanical engineering or interdisciplinary nature in real time situations and provide analytical and/or software solutions for their overall development.

(PSO-2) Students will be able to impart technological inputs and acquire managerial skills to become technocrats and entrepreneurs to build the nation, by developing new concepts in emerging fields through intellectual property rights, tech startups and pursuing higher education.

**Programme Educational Objectives for M. Tech. (Production Engineering)**

Post Graduates of Mechanical-Production Engineering program will

**PEO1:** Demonstrate the domain expertise and leadership qualities with professional skills to analyze, synthesize and execute real life projects in Mechanical-Production engineering and allied fields.

**PEO2:** Contribute to the development of scientific/technological knowledge/innovation in various domains of Mechanical-Production engineering individually, reflectively and/or in team with the aid of modern tools.

**PEO3:** Exhibit ethical and social responsibility with concern for diverse local and global issues.

**Programme Outcomes for M. Tech. (Production Engineering)**

**PO1:** Apply appropriate research methodologies and demonstrate higher order skill individually, in groups to the development works in the domain of Mechanical Production Engineering to solve practical problems. (Research Skill)

**PO2:** Communicate with engineering community and society at large, confidently and effectively, through technical report, documentation and presentation, by adhering to appropriate standards. (Communication)

**PO3:** Demonstrate degree of mastery in Mechanical Production Engineering at a level higher than the requirements in the appropriate bachelor program. (Scholarship of Knowledge)

**PO4:** Apply appropriate research methodologies to develop scientific and technical knowledge to understand group dynamics, which will lead towards collaborative multidisciplinary research. (Critical Thinking and Problem Solving)

**PO5:** Analyze complex problems optimally in Mechanical- Production Engineering for real life solutions and further to solve them by considering various aspects like, life-long learning, self-motivation, socio-economics, ethical behaviour. (Ethical Practices, Social responsibility and Life-long learning)

**PO6:** Gain expertise in latest trends and technologies in the fields of Mechanical-Production Engineering like, manufacturing processes, automation, robotics, mechatronics, advanced welding, Industrial engineering and operations research, FEM, etc. and apply them efficiently to carry out project independently. (Programme specific outcome)

**Programme Educational Objectives for M. Tech. (Design Engineering)**

Post Graduates of Mechanical-Design Engineering program will

**PEO1:** Demonstrate the domain expertise and leadership qualities with professional skills to analyze synthesize and execute real life projects in Mechanical-Design engineering and allied fields.

**PEO2:** Contribute to the development of scientific/ technological knowledge / innovation in various domains of Mechanical-Design engineering individually, reflectively and/or in team with the aid of modern tools.

**PEO3:** Exhibit ethical and social responsibility with concern for diverse local and global issues.

**Programme Outcomes for M. Tech. (Design Engineering)**

**PO1:** Apply appropriate research methodologies and demonstrate higher order skill individually, in groups to the development works in the domain of Mechanical Design Engineering to solve practical problems. (Research Skill)

**PO2:** Communicate with engineering community and society at large, confidently and effectively, through technical report, documentation and presentation, by adhering to appropriate standards. (Communication)

**PO3:** Demonstrate degree of mastery in Mechanical Design Engineering at a level higher than the requirements in the appropriate bachelor program. (Scholarship of Knowledge)

**PO4:** Apply appropriate research methodologies to develop scientific and technical knowledge to understand group dynamics, which will lead towards collaborative multidisciplinary research. (Critical Thinking and Problem Solving)

**PO5:** Analyze complex problems optimally in Mechanical-Design Engineering for real life solutions and further to solve them by considering various aspects like, life-long learning, self-motivation, socio-economics, ethical behaviour. (Ethical Practices, Social responsibility and Life-long learning)

**PO6:** Acquire expertise in latest trends and technologies in the fields of Mechanical-Design Engineering like, Stress analysis, Vibration analysis, Condition monitoring, Noise Control and contribute to innovation. (Programme specific outcome)

**Programme Educational Objectives for M. Tech. (Heat Power Engineering)**

Post Graduates of Mechanical-Heat Power Engineering program will

**PEO1:** Demonstrate the domain expertise and leadership qualities with professional skills to analyze, synthesize and execute real life projects in Mechanical- Heat Power engineering and allied fields.

**PEO2:** Contribute to the development of scientific / technological knowledge / innovation in various domains of Mechanical – Heat Power engineering individually, reflectively and / or in team with the aid of modern tools.

**PEO3:** Exhibit ethical and social responsibility with concern for diverse local and global issues.

**Programme Outcomes for M. Tech. (Heat Power Engineering)**

**PO1:** Apply appropriate research methodologies and demonstrate higher order skill individually, in groups to the development works in the domain of Mechanical Heat Power Engineering to solve practical problems. (Research Skill)

**PO2:** Communicate with engineering community and society at large, confidently and effectively, through technical report, documentation and presentation, by adhering to appropriate standards. (Communication)

**PO3:** Demonstrate degree of mastery in Mechanical Heat Power Engineering at a level higher than the requirements in the appropriate bachelor program. (Scholarship of Knowledge)

**PO4:** Apply appropriate research methodologies to develop scientific and technical knowledge to understand group dynamics, which will lead towards collaborative multidisciplinary research. (Critical Thinking and Problem Solving)

**PO5:** Analyze complex problems optimally in Mechanical Heat Power Engineering for real life solutions and further to solve them by considering various aspects like, life-long learning, self-motivation, socio-economics, ethical behaviour. (Ethical Practices, Social responsibility and Life-long learning)

**PO6:** Gain expertise in latest trends and technologies in the fields of Mechanical Heat Power Engineering like, computational, mathematical, Modelling software and apply them efficiently to carry out project independently. (Programme specific outcome)