OFFERED PROGRAMMES

Department of Mechanical Engineering offers program that is affiliated to C.S.J.M.University, Kanpur and recognized by AICTE:

- **Bachelor of Technology Degree in Mechanical Engineering.**

Mechanical EngineeringProgramme Outcomes

PO1	Engineering knowledge: Apply knowledge of mathematics, science and engineering to analyze, design and evaluate mechanical components & systems using state -of-the-art IT tools.
PO2	Problem analysis: Analyze problems of mechanical engineering including thermal, manufacturing and industrial systems to formulate design requirements.
PO3	Design/development of solutions: Design, implement, and evaluate mechanical systems and processes considering public health, safety, cultural, societal and environmental issues.
PO4	Conduct investigations of complex problems: Design and conduct experiments using domain knowledge and analyze data to arrive at valid conclusions.
PO5	Modern tool usage: Apply current techniques, skills, knowledge and computer-based methods & tools to develop mechanical systems, understanding of the limitations.
PO6	The engineer and society: Analyze the local and global impact of modern technologies on individual organizations, society and culture and professional engineering practice.
PO7	Environment and sustainability: Apply knowledge of contemporary issues to investigate and solve problems with a concern for sustainability and eco friendly environment.
PO8	Ethics: Apply ethical principles and commit to professional ethics and legal responsibilities and social norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively in diverse groups and exhibit leadership qualities, to comprehend and write effective reports.
PO11	Project management and finance: Apply management principles to manage projects in multidisciplinary environment.
PO12	Life-long learning: Pursue life-long learning as a means to enhance knowledge and skill.

Mechanical Engineering Programme Specific Outcomes

PSO1	To empower the students to apply practical skills, knowledge in major streams such as design, thermal, manufacturing and industrial engineering
PSO2	To enable the student to take up career in industries or to pursue higher studies in mechanical and interdisciplinary programs with regard to ethics, environment and society.

TCA –S 102Workshop Practice

CO1	To Study on different machine tools and their operations.
CO2	Basic knowledge of casting processes and their applications.
CO3	Recognize the different types metal forming process and their operations.
CO4	Introduction to basic fabrication processes such as welding
CO5	To study on Modern trends in manufacturing, Unconventional machining Processes and Automation

ESC-S201 Engineering Mechanics

CO1	The Fundamentals of engineering mechanics and their applications.
CO2	Gain knowledge of various types of motion related to body.
CO3	To provide basic concept of friction and application of friction.
CO4	To identify appropriate structural system for studying a given problem and isolate it from its environment.
CO5	To carry out kinematic and kinetic analyses for particles and systems of particles.
CO6	To apply the principles of mechanics to practical engineering problems.

ESC-S202Thermodynamics

CO1	Identify the unique vocabulary associated with thermodynamics and explain the basic concepts of thermodynamics like system, properties, equilibrium, pressure, specific volume, temperature, zeroth law of thermodynamics, temperature measurement and temperature scales.
CO2	Distinguish between ideal gas and pure substance. Calculate thermodynamic properties using tables of thermodynamic properties and analyze the processes on T-v diagrams to solve advanced engineering problems.
CO3	Explain the concept of thermodynamic work. Calculate and compare work in case of a closed system executing different thermodynamic processes or different thermodynamic cycles.
CO4	State and apply the first law of thermodynamics for closed and open systems undergoing different thermodynamic processes. Evaluate the performance of steam power plants, refrigeration plants and their components using the first law of thermodynamics for open systems.
CO5	State and prove the equivalence of two statements of second law of thermodynamics. Define reversible process and state the propositions regarding efficiency of Carnot cycle. Evaluate the feasibility of a thermodynamic cycle using the second law of thermodynamics for typical engineering problems.
CO6	Quantify the second law of thermodynamics for a cycle by establishing the inequality of Clausius. Apply the inequality of Clausius and establish the property entropy of a system. Derive and apply principle of increase of entropy to evaluate the feasibility of a thermodynamic process.

MEE-S201Mechanical Design & Drawing

CO1	Identify the national and international standards pertaining to machine drawing.
CO2	Apply limits and tolerances to assemblies and choose appropriate fits.
CO3	Recognize machining and surface finish symbols.
CO4	Explain the functional and manufacturing datum.
CO5	Illustrate various machine components through drawing

MEE-S202 Basic Solid Mechanics

CO1	Understand the fundamental concepts of stress & strain and the relationship between elastic constant complex stress system and theories of failure
CO2	Calculate and represent the stress & strain in bars and simple structures
CO3	Solve problems relating to pure bending of beams and other simple structures
CO4	Solve problems relating to torsional deformation of bars and other simple structures
CO5	Understand the concept of buckling and be able to solve the related problems
CO6	Understand the stresses generated in different springs under axial & torsional loading.
CO7	Solve problems relating to design of pressure vessels
CO8	Solve problems related to deflection of beam

MEE –S 301 Dynamics of Machines & Vibrations

CO1	Determine the natural frequency of transverse vibrations of the shaft and torsional vibrations of rotor systems
CO2	Compute the natural frequencies and mode shapes of a multi degree of freedom system and explain the modal analysis of a vibrating system.
CO3	Select the numerical methods to determine natural frequencies of the beam and rotor systems.
CO4	Describe the vibration measurement by using transducers and vibration exciters.
CO5	Analyze the mathematical modeling of the two degrees of freedom systems and explain about the working principle of vibration absorber.

MEE –S 302 Advanced Fluid Mech.

CO1	Understanding to State the Newton's law of viscosity and Explainthe mechanics of fluids at rest and in motion by observing the fluid phenomena
CO2	Applying and Analyzing to Compute force of buoyancy on a partially or fully submerged body and Analyzethe stability of a floating body.
CO3	Applying to Derive Euler's Equation of motion and Deduce Bernoulli's equation.
CO4	Applying and Analyzing to Compute force of buoyancy on a partially or fully submerged body and Analyzethe Examine energy losses in pipe transitions and sketch energy gradient lines.
CO5	Evaluating pressure drop in pipe flow using Hagen-Poiseuille's equation for laminar flow in a pipe
CO6	Understanding to Distinguish the types of flows and determinesonic velocity in a fluid.

MEE –S303IC Engines, Steam & Nuclear Power

CO1	Understand the basic component and working cycle of the IC engine
CO2	Understand the parameters that affect engine performance, combustion, knock.
CO3	Apply thermodynamics cycles for steam power plant
CO4	Evaluate the performance of boiler
CO5	Know the components which improve the performance of boiler and steam turbines
CO6	Understand functions of the components of nuclear power plant.

MEE–S 304Lab-1 Appl. Mech., Fluid Mech., Vibrations

CO1	Calibration of Venturimeter& Orifice meter
CO2	Coefficient of discharge for a small orifice / Mouth piece by constant head method
CO3	Calibration of contracted rectangular notch / triangular Notch.
CO4	Determination of friction factor of pipe
CO5	Co-efficient for minor losses in different types of pipes.
CO6	Verification of Bernoulli's Equation
CO7	Impact of jet on vanes
CO8	Designing a suitable mechanism depending on application
CO9	Drawing displacement diagrams and cam profile diagram for followers executing different types of motions and various configurations of followers,
CO10	Drawing velocity and acceleration diagrams for different mechanisms,
CO11	Selecting gear and gear train depending on application.

MEE –S 401Computer Aided Manufacturing

CO1	To Study the Automation and need and future of NC Systems, To educate students by covering different aspects of computer Aided Manufacturing.
CO2	Basic knowledge of NC and CNC machines and its components
CO3	Improves the quality of manufacturing and To educate students by covering robotics and different material handling system required in manufacturing shop floor.
CO4	To create strong skills of writing NC/CNC programs, Basic knowledge of Manual part programming and Basic knowledge of APT programming
CO5	To educate students to understand different advances in manufacturing system like: GT, CAPP and FMS.

MEE –S 402 Refrigeration & Air-Conditioning

CO1	To cover the basic principle of psychrometric and applied psychrometric.
CO2	Familiarizedstudents with load calculation and duct design.
CO3	Familiarizedstudents with the refrigerants, vapour compression refrigeration system and multi stage vapour compression system.
CO4	Understand the concept of vapour compression refrigeration system and other cooling system
CO5	Familiarizedstudents with the terminology associated with refrigeration and air-conditioning.

MEE –S 403 Industrial Management & Production System

CO1	Understand the concepts of management system and production system
CO2	Understand the basics of production planning and control
CO3	Understand the work measurement and it's tools
CO4	Concepts of Resource allocation and linear programming
CO5	Importance of Plant lay out and material handling
CO6	Understand the Job decision & project management using PERT & CPM
CO7	Inspection and Quality control and the related tools
CO8	Understand the concept of forecasting and line balancing.

PRT–S 401 B. Tech Project-I

CO1	Undertake problem identification, formulation and solution.
CO2	Design engineering solutions to complex problems utilising a systems approach.
CO3	Communicate with engineers and the community at large in written and oral form.
CO4	Demonstrate the knowledge, skills and attitudes of a professional engineer.