छत्रपति शाहू जी महाराज विश्वविद्यालय, कानपुर



CHHATRAPATI SHAHU JI MAHRAJ UNIVERSITY, KANPUR

(पूर्ववर्ती कानपुर विश्वविद्यालय कानपुर) Formerly Kanpur University, Kanpur – 208024

A Documentary Support

For Matric No. – 1.1.1

Programme Outcomes & Course Outcomes

Under the Criteria - I (Curriculum Design and Development) Key Indicator - 1.1 In

Matric No. – 1.1.1

B. Tech. (Mechanical Engineering)

I SUMIT JI

nato Internal Quality Assurance Cell

CSJM University, Kanpur

(Registrar) C.S.J.M.University C.S.J.M. UNIVERSULY

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. |
| CO 4 | 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. |
| CO 4 | To identify appropriate structural system for studying a given problem and isolate it from its environment. |
| C05 | 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-S202Basic 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. |
| C07 | 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. |

| 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, |
| C011 | Selecting gear and gear train depending on application. |

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

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 402Refrigeration & Air-Conditioning

| CO1 | To cover the basic principle of psychrometric and applied psychrometric. |
|-----|---|
| CO2 | Familiarized students with load calculation and duct design. |
| CO3 | Familiarized students 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 | Familiarized students with the terminology associated with refrigeration and air-conditioning. |

MEE –S 403Industrial 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 401B. 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. |