COURSE OUTCOMES

In order to fulfill Program Educational Objectives (PEOs) and attain Program Outcomes (POs) every Program prescribes certain number of Courses within it. Each Course thus prescribed has its own Course Outcomes (COs) which every student has to attain after completing that particular Course.

Following pages enlist the Course Outcomes of all the courses from the First Semester of S. Y. B Tech. to the Final Semester B. E.

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES S. Y. B Tech. SEMESTER-I

ENGINEERING MATHEMATICS-III

1. SolveLinear Differential Equations with constant coefficients.
2. Describe the statistical data numerically by using Lines of regression and Curve fittings.
3. Find Laplace transforms of given functions and use it to solve linear differential equations.
4. Applyknowledge of vector differentiation to find directional derivatives, curl & divergence of vector fields.
5. Develop Fourier series expansion of a function over the given interval.
6. Make use ofPartial Differential Equation to solve the Mechanical Engineering problems.

ELECTRICAL TECHNOLOGY

1. Deals the principles of Electrical Engineering
2. Understands the theoretical and practical's concepts of Electric motors
3. Apply Electrical heating methods for Industrial furnaces.
4. Identify and select suitable types of motors and drives
5. Decide complete Electrical drive system for Industrial applications.
6. Design various speed control techniques for Electric motors.

APPLIED THERMODYNAMICS

1. Remember the fundamental laws of thermodynamics
2. Understand and solve the introductory problems on Rankine cycle.
3. Classify steam generators and condensers and Steam turbines.
4. Design the steam nozzle.
5. Understand and Solve problems on Steam turbines.
6. Understand the property of lubricants and selection of lubricants

METALLURGY

1. Understand basic concept of metal structure.
2. Understand fundamental knowledge of Ferrous and Non Ferrous Metal.
3. Selection of Metals and Alloys for different application.
4. Understand need of Heat treatment and various heat treatment processes.
5. Understand procedure of different heat treatments to induce required properties.
6. Define and describe principles of powder metallurgy, stages of manufacturing and applications.

FLUID MECHANICS

1. Understand properties of fluids and classification of fluid flows

2. Identify the fluid flow problem and explain the theoretical concepts of fluid statics, fluid kinematics and fluid dynamics

3. Apply fundamental equation of fluid mechanics i.e. Continuity equation, Bernoulli's Equation and momentum equation for different fluid flow applications

4. Make basic analysis of laminar flow to calculate resistance to it through circular pipe and parallel plates

5. Calculate different losses in fluid flow through different arrangements of pipes

6. Apply theory of boundary layer, Drag and lift forces in proper cases

MACHINE DRAWING

1. Use BIS conventions in machine drawings.

2. Find line/curve of intersection between two solids.

3. Sketch the various machine components.

4. Read and interpret the given production drawings.

5. Understand significance of assembly and detail drawings.

6. Understand various GD & T symbols and conventions of an Engineering drawing.

COMPUTER PROGRAMMING USING C++

1. Write, compile and debug programs in C++ language.

2. Design programs involving decision control statements, loop control statements and case control structures.

3. Develop algorithms for solving problems using object oriented language.

4. Apply their knowledge and programming skills to solve various computing problems in the field of Mechanical Engineering.

5. Compile the multidisciplinary programs by using C++

6. Interpret the object oriented programming applications to solve mechanical problems

WORKSHOP PRACTICE III

1. Understand types of Patterns, Core boxes and Preparation of Pattern for solid casting.

2. Understand properties of sand by permeability test, moisture percentage test, and green strength.

3. Understand gating system for metal casting with casting defects.

4. Student will be able to explain the principles and techniques of pattern making.

5. Student will be able to describe the process of mould and core making.

6. Student will be able to test the Permeability and Green compressive strength of mould sand.

COURSE OUTCOMES S. Y. B Tech. SEMESTER-II

APPLIED NUMERICAL METHODS

1. Understand and apply various methods to find roots of equations.

2. Learn and Implement different methods to solve simultaneous equations.

3. Understand and apply the methods of Regression and interpolation.

4. Implement various numerical methods for differentiation and Integration.

5. Apply various methods to solve engineering problems with Ordinary differential equations.

6. Understand the methods to solve Partial differential equations involved in Engineering Problems.

ANALYSIS OF MECHANICAL ELEMENTS

1. Apply concepts of analysis of mechanical elements to obtain solution to various types of loading and stresses induced in real time engineering problems.

2. Draw shear force and bending moment diagrams for simple beams under various loads and supports.

3. Compute and analyze bending and shear stresses in mechanical components.

4. Determine plane stress, principal stress .maximum shear stress and their orientations using analytical method and Mohr's circle.

5. Analyze the effect of deflection in beams.

6. Evaluate buckling and strain energy in beams subject to various types of loading.

FLUID &TURBO MACHINERY

1. Classify and understand working principle of rotodynamic machines and Reciprocating compressor.

2. Understand Euler's equation of rotodynamic machines

3. Understand the design process of pelton wheel turbine and Francis turbine.

4. Apply the theoretical knowledge to solve numerical problems, select the machinesfor particular application.

5. Analyze the machines to evaluate the performance.

6. know the gas turbine and their performance under various conditions.

THEORY OF MACHINES I

1. Understand different types of mechanisms and their applications

2. Analyze kinematic theories of mechanism,

3. Design cam with follower for different applications

4. Select different power transmitting elements according to application

5. Select different governing mechanisms according to application.

6. Design an application of Power Screw i. e. Screw Jack.

MACHINE TOOLS &PROCESSES

1. Identify various kinds of machine tools of previous and present era tools.

2. Describe construction and working of basic machine tools.

3. Demonstrate their understanding of plastic processing, injection molding, extrusion and thermoforming.

4. Analyze the concept, mechanism of material removal with respect different processes.

5. Be in position to appreciate the merits of non-traditional machining and its applications in industries.

6. Select appropriate manufacturing processes for the typical applications.

TESTING &MEASUREMENT

1. Understand basic constriction of working of various instruments

2. Select the several types of instruments for the measurement system.

3. Estimate different mechanical quantities using respective measuring instruments.

4. Understand the principles of various types of sensors used in Industries for solving the critical problems.

5. Understand their general qualities and terminologies of sensing and transduction principles.

6. Student will be able to designing a research instrument as per requirement of industry.

COMPUTER AIDED DRAFTING

1. Draw 2D drawings and 3D models of simple components.

2. Analyze and interpret production Drawing

3. Use modern engineering techniques, tools and skills for engineering practice.

4. Develop the skills for drafting using CAD software and get the knowledge to enhance the CAD utilities.

5. Prepare a mechanical drawing involving GD & T symbols.

6. apply appropriate commands to construct 3D solid models.

COMPUTER GRAPHICS

1. To acquire the knowledge of basics of computer graphics.

2. To Apply basic programming in C for line, rectangle, circle etc for different shapes.

3. To recognize the importance of using three dimensional transformations like translation, scaling and rotating.

4. To Analyzing the hidden unwanted parts in graphics and do the program on animation

5. To program and draw the different curves and surfaces.

6. Decide a specific algorithm to create a particular graphics or animation.

WORKSHOP PRACTICE IV

1. Understand Machine layout, method of Machine Tool installation, selection of Tools for various machining operation.

2. Understand Construction, Mechanism and Application of Lathe Machine, Drilling Machine, and Milling Machine.

3. Understand & prepare a job involving various machining operations along with process sheets.

4. Understand basics of CNC and VMC.

5. Prepare a process sheet for different operations on a lathe machine tool.

6. Select the specific machine tool for a particular operation.

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES T. Y. B Tech. SEMESTER-I

CONTROL ENGINEERING

1. Describe various methods to solve control systems problems.
2. Establish a correlation between analytical methods and similar control system problem.
3. Determine system stability and system response.
4. Interpret the methods and solutions obtained by them.
5. Compile and execution of programs in MATLAB to various problems.
6. Evaluate and optimize the performance of control systems problems

THEORY OF MACHINES II

1. Explain the types of gears, gear trains.
2. Solve problems on gears, gear trains.
3. Apply gyroscopic couple principle to aeroplane, ship & discuss its effect.
4. Demonstrate rotary balancing and to solve problems of reciprocating balancing.
5. Analyze forces of various mechanisms.
6. Evaluate design parameters of flywheel

HEAT & MASS TRANSFER

1. Formulate basic equations for heat transfer problem.
2. Apply heat transfer principles to design and evaluate performance of thermal systems.
3. Calculate the effectiveness and rating of heat exchangers.
4. Calculate heat transfer by radiation between objects with simple geometries.
5. Calculate and evaluate the impact of boundary conditions on solution of heat transfer problems.
6. Evaluate the relative contribution of different modes of heat transfer.

MACHINE DESIGN I

1. Describe various basic machine components.
2. Associate various machine components to their engineering purpose.

3. Apply basic principles of machine design to calculate strength requirements.

4. Interpret the design results to predict the life of the components.

5. Use design data books to create standard practices.

6. Recommend various machine components from manufacturer's catalog.

MANUFACTURING ENGINEERING

1. Demonstrate the knowledge of single and multipoint cutting tools.

2. Synthesize jigs and fixtures.

3. Analyze the single spindle automat, tool layout, cam design.

4. Evaluate and design dies for press working operations.

5. Use CNC technology.

6. Examine the metal cutting technology including the process, measurements, design and selection of various cutting tools and their industrial specifications.

ENTERPRIZE RESOURCE PLANNING (OPEN ELECTIVE-I)

1. Understand the structure and process chains implementation of an ERP system.

2. Implementation and customization of an ERP system using the appropriate modeling methods

3.Understand the customization of an ERP system and customize essential parts of materials management, production, controlling and sales in SAP ECC

4.Understand software design issues in state-of-the-art business software and realize the importance of project management in an ERP implementation project

5.Understand what to expect, and not to expect, from a consultant implementing an ERP system

6.Understand the importance of IT governance in long-term relationships with a software vendor, such as SAP

CAD/CAM LABORATORY

1. Describe the role of CAD/CAM in modern Design and manufacturing.

2. Define the fundamental theory and underlying concept of CAD/CAM.

3. Understand basic concepts of CNC Programming and machining.

4. Analyze various types of modeling techniques.

5. Design mechanical parts and elements in 2D and 3D using state of the art CAD/CAM systems.

6. Create and import/export a CAM model and generate machining code automatically using CAM system.

PROFESSIONAL SKILL DEVELOPMENT

1. Extend their representation of personal and professional skills.

2. Discover their own strengths and weaknesses as emerging professionals.

3. Strengthen technical and soft skills necessary for workplace success

4. Increase awareness of marketability on the job market and confidence in abilities

5. Make the transition effectively from school to the workplace

6. Manage their career by navigating through the working world more effectively.

WORKSHP PRACTICE V

1. Know appropriate parameters to be used for various machining operations.

2. Understand the relation between Design and Manufacture regarding surface finish and process limitation.

3. Know the ancillary technologies such as manufacturing of cutting tools and use of cutting fluids

4. Develop the knowledge of workshop practice and basic use of machine tools.

5. Understand application of different processes according to design need.

6. Understand the different tool materials and their applications.

MINI PROJECT PHASE I

1. Perform team work to identity an engineering task.

2. Practice the steps involved for the selection, execution and reporting of the project

3. Apply their engineering knowledge to real life problem solving.

4. Able to work in a group on specific assignment.

5. Think creatively to come out with feasible solution for engineering real life problem.

6. Think independently in a group on their own to bring out the conclusion under given circumstances and to expose them to industry

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES T. Y. B Tech. SEMESTER-II

INDUSTRIAL MANAGEMENT AND OPERATION RESEARCH

1.Apply the concepts or industrial management and operations research approaches.

2. Analyze issues in managing operations and projects and various approaches to resolve those issues.

3. Understand the principles of research and link the research process with theories of their specialist areas.

4. Formulate and solve various problems techniques such as LPP, Transportation and Assignment problems.

5. Handle projects in Industry by applying Techniques as Decision theory, network model and sequencing models.

6. To start small scale industry.

INDUSTRIAL FLUID POWER

1. Apply physical laws and principles that govern behavior of fluid power system.

2. Interpret various hydraulic and pneumatic ISO/GIC symbols.

3. Analyze the fluids and components used in modern industrial fluid power systems.

4. Prepare hydraulic pneumatic circuits on fluid power trainer units.

5. Recommend fluid power maintenance and safety practices.

6. Recognize the applications of fluid power in process, construction and manufacturing industries.

METROLOGY & QUALITY CONTROL

1. Understand the use of standards in measurement, limits, fits and tolerances.

2. Understand the principles, construction, working and use of comparators and angle measuring instruments.

3. Measure geometrical forms and surface roughness

4. Apply the methods of measurement of screw threads and gears.

5. Understand the concept of quality and different QC tools.

6. Interpret various control charts and their applications in process control.

MACHINE DESIGN II

1. Able to outline various machine elements.

2. Describe failure criteria and design process of various machine elements.

3. Compute different strength elements of various engineering components.

4. Analyze the design results so as to predict the life expectancy of components.

5. Design a mechanism by integrating various design methodologies.

6. Recommend the evaluation methodology for a given mechanism.

INTERNAL COMBUSTION ENGINES

1. Explain functions of various parts of the engine and combustion mechanism.

2. Describe CI and SI engine nomenclature.

3. Apply knowledge of engine cycles and nomenclature while examining constructional details.

4. Distinguish and explain engine systems.

5. Plan to minimize reduce or control the pollution.

6. Measure brake horsepower of internal combustion engine

ENGINEERING SYSTEM MODELING & SIMULATION (OPEN ELECTIVE-II)

1. Understand the need to develop simulation model and apply it to solve real world problem

2. Describe the role of important elements of discrete event simulation and modeling.

3. Summarize real world situations related to systems development decisions

4. Use commercial software to construct, verify and validate models of the given systems

5. Interpret the model apply the results to resolve critical issues in real world environment

COMPUTER INTEGRATED MANUFACTURING LAB

1. Demonstrate the knowledge of single and multipoint cutting tools.

2. Synthesis jigs and fixtures.

3. Analyze the single spindle automat, tool layout, cam design.

4. Evaluate and design dies for press working operations.

5. Use CNC technology.

6. Examine the metal cutting technology including the process, measurements, design and selection of various cutting tools and their industrial specifications.

SEMINAR

1. Have and develop presentation skills.

2.Impart knowledge in different aspects of knowledge domains.

3.Make them aware of knowledge in industry perspective and new industry trends.

4.Build confidence and improve communication skills.

5.Collect ideas through literature survey about new innovations, analyze and present them.

6.Sharpen their personality and intelligence.

WORKSHOP PRACTICE VI

1. Know appropriate parameters to be used for various machining operations.

2. Understand the relation between Design and Manufacture regarding surface finish and process limitation.

3. Know the ancillary technologies such as manufacturing of cutting tools and use of cutting fluids

4. Develop the knowledge of workshop practice and basic use of machine tools.

5. Understand application of different processes according to design need.

6. Understand the different tool materials and their applications.

MINI PROJECT PHASE II

1. Perform team work to identity an engineering task.

2. Practice the steps involved for the selection, execution and reporting of the project

3. Apply their engineering knowledge to real life problem solving.

4. Work in a group on specific assignment.

5. Think creatively to come out with feasible solution for engineering real life problem.

6. Think independently in a group on their own to bring out the conclusion under given circumstances and to expose them to industry

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES B. E. SEMESTER-I

REFRIGERATION & AIR CONDITIONING

1. Know the different components and working of vapor compression & vapor absorption refrigeration system.

2.Distinguish between different vapor refrigeration cycles and solve various problems for specified operating conditions.

3. Compare Carnot, Theoretical and Practical CoP of a refrigeration system.

4. List different psychrometric properties and their importance in air conditioning process.

5. Design an air conditioning system using cooling load calculation for summer and winter.

6. Describe different applications of refrigeration and air conditioning in various fields like food and medicine storage, manufacturing processes and cryogenic applications.

MECHANICAL SYSTEM DESIGN

1. Apply the various concepts of aesthetics economics system approach and Optimization techniques in the design of various mechanical systems.

2. Identify formulate and solve engineering design problems of pressure vessels clutch and braking systems.

3. Design and develop multi speed gear boxes used in machine tool applications.

4. Understand the variability in manufacturing, design and natural tolerances and applied the knowledge of statistical considerations to control the quality.

5. Identify and quantify the specifications to use standards and codes to select the components commonly used in mechanical system design.

6. Develop the understanding of various aspects of design for manufacture and assembly.

FINITE ELEMENT ANALYSIS

1. Understand the fundamental theory of the FEA method.

2. State various mathematical models solution of common engineering problems.

3. Solve Structural, Thermal and Fluid flow problems using FEA.

4. Evaluate and interpret finite element analysis results for design and development.

5. Use a commercial finite element package like ANSYS to build finite element models and solve a selected range of engineering problems.

6. Communicate effectively in writing a report the method used the implementation and the numerical results obtained.

AUTOMOBILE ENGINEERING (ELECTIVE-I)

1. Identify major components of automobiles types of vehicle layouts.

2. Differentiate between different types of automobile power plants gearboxes steering systems braking systems and Suspension systems.

3. Solve problems related to performance of automobiles and braking systems.

4. Classify and compare automobiles, steering systems braking systems and Suspension systems.

5. Describe the different components of electrical system of automobiles.

6. Explain the distinguishing features of two wheelers and three wheelers.

TOTAL QUALITY MANAGEMENT (ELECTIVE-II)

1. Understand importance of assuring quality in the service or manufacturing sector and explain Quality assurance system.

2. Identify and solve the quality related problems in manufacturing or service sector at various stages by using various TQM tools and techniques.

3. Calculate reliability of system

4. Understand vendor rating and select suitable vendor

5. Interpret various quality attributes and discuss the various quality approaches.

6. Comment on quality using Taguchi Philosophy.

INDUSTRIAL PRODUCT DESIGN (ELECTIVE-II)

1. List and describe the characteristics of industrial design.

2. Classify and distinguish between the characteristics product design and development process.

3. Demonstrate aesthetic and economic considerations.

4. Design and modify the existing product design.

5. Decide Environmental effects on the development process.

6. Evaluate and conclude the capability of industrial product design process.

INDUSRTIAL TRAINING

1. Demonstrate the use, interpretation and application of an International engineering standard in a specific situation.

2. Analyze a given engineering problem, identify an appropriate solving methodology and implement it to give meaningful solution.

3. Identify sources of hazards and assess or identify appropriate health and safety measures.

4. Understand the importance of sustainability and cost effectiveness in design and development process.

5. Interact with multi-skilled engineer with sound technical knowledge and management, leadership and entrepreneurship skills.

6. Get exposed to social, cultural, global and environmental responsibilities as an Engineer.

PROJECT PHASE-I

1. Think creatively on real life engineering problem.

2. Apply engineering knowledge to deduce proper solution to real life engineering problems.

3. Work in a team and acquire collaborative skills to achieve common goals.

4. Learn independently, reflect on their learning and take appropriate actions to improve it.

5. Communicate effectively and present ideas clearly with specific audience in written and oral forms.

6. Plan for activities in order to complete the task in predefined time.

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES B. E. SEMESTER-II

MECHATRONICS

1. Identify mechatronics system and its basic components.

2. Describe the importance of integration of mechanical electronics and control engineering and design of mechatronics system.

3. Demonstrate PLC robotics and its programming.

4. Analyze mechanical, electronics and control systems in selecting mechatronics system.

5. Design a mechatronics system with elements of sensors and transducers and interfacing the same with problem under consideration.

6. Handle multidisciplinary projects by applying mechatronics system design.

ENERGY & POWER ENGINEERING

1. Define and describe power plant collect information about the power plants available across India.

2. Distinguish between types of power plants thermal hydroelectric at cetera and describe the main features.

3. Draw the different types of load curves and show their performances.

4. Solve the problems related to power plant performance analysis.

5. Compile information related to safety and maintenance in power plants and energy audit.

6. Compare different types of power plants measure the performance and recommend the best one.

NOISE & VIBRATIONS

1. Develop mathematical model to represent dynamic system.

2. Estimate natural frequency of mechanical element or system.

3. Analyze vibratory response of mechanical element or a system.

4. Estimate the parameters of vibration isolation system.

5. Carry out measurement of various vibration parameters.

6. Understand relevance of noise in mechanical systems.

INDUSTRIAL ENGINEERING (ELECTIVE-III)

1. Describe Tools and techniques of industrial engineering.

2. Describe and interpret various techniques in production planning and control and inventory control.

3. Apply techniques Tools and techniques in facility planning.

4. Analyze factors affecting productivity.

5. Develop applications of Value Engineering and work study.

6. Justify scope of human factors engineering.

CRYOGENICS

1. Describe different kinds of systems. Students will be able to understand and interpret the analysis report in the field of cryogenics.

2. Apply knowledge of Mathematics, Science and Engineering for the needs in cryogenics.

3. Design systems as per the desired needs based on economic, social and environmental issues associated with engineering practices.

4. Communicate required information to develop various ideas related to design for research in different cryogenic systems.

5. Contribute knowledge to solve step-by-step problems for lifelong learning.

ENTERPRISE RESOURCE PLANNING

1. Understand basics, evolution, advantages and importance of ERP.

2. Correlate ERP and related Technologies, BPR, MIS, EIS, DSS, CRM, PLM etc.

3. Understand manufacturing perspective of ERP.

4. Know various business modules of ERP.

5. Understand the key implementation issues and some popular products in ERP.

6. Understand implementation of ERP package.

PROJECT PHASE-II

1. Able to think creatively on real life engineering problem.

2. Apply engineering knowledge to deduce proper solution to real life engineering problems.

3. Work in a team and acquire collaborative skills to achieve common goals.

4. Learn independently, reflect on their learning and take appropriate actions to improve it.

5. Communicate effectively and present ideas clearly with specific audience in written and oral forms.

6. Plan for activities in order to complete the task in predefined time.