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COLLEGE OF ENGINEERING, KOLHAPUR

Name of Department: - MECHANICAL ENGINEERING
Class: - Second Year B. Tech. Sem:- III
Course: - BSC-ME201- ENGINEERING MATHEMATICS III

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1.Solve Linear 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.Apply knowledge of vector differentiation to find directional derivatives, curl and divergence of vector fields.

5.Develop Fourier series expansion of a function over the given interval.

6.Make use of Partial Differential Equation to solve the Mechanical Engineering problems.

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Name of Department: - MECHANICAL ENGINEERING

Class:-Second Year BTECH Sem:- III

Course: -PCC-ME202 Electrical Technology

Course Outcomes:

Upon successful completion of this course, the student will be able to:

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.

Name of Department: - MECHANICAL ENGINEERING

Class:- S.Y.. B. Tech. Sem:- III

Course: - PCC-ME203 Applied Thermodynamics

Course Outcomes: At the end of this course, student will be able to

1.Remember the fundamental laws of thermodynamics

2.Understand and Solve the introductory problems on Ranking 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.

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Name of Department: - MECHANICAENGINEERING
Class:- Second Year B. Tech. Sem:-III
Course: - PCC-ME204 Metallurgy

Course Outcomes:

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.

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Name of Department: - MECHANICAL ENGINEERING

Class: - Second Year B. Tech. Sem:- III

Course: - ME-PCC205 Fluid Mechanics

Course Outcomes:

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

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Name of Department: - MECHANICAL ENGINEERING
Class:- Second Year B. Tech. Sem:- III
Course: - PCC-ME206 Machine drawing

Course Outcomes:

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

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Name of Department: - MECHANICAL ENGINEERING
Class:- S.Y.. B. Tech. Sem:- III
Course: - PCC-ME207 C++

Course Outcomes: At the end of this course, student will be able to

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

5.In the field of Mechanical Engineering.

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Name of Department: - MECHANICAL ENGINEERING
Class:-S.Y. B. Tech. Sem:- III
Course: - PCC-ME208 Workshop Practice III

Course Outcomes:

At the end of this course, student will be able to

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

Name of Department: - MECHANICAENGINEERING
Class:- Second Year B. Tech. Sem:- IV
Course: - BSC-ME211 Analysis of Mechanical Element

Course Outcomes:

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 subjected to various loads and support conditions.

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.

Name of Department: - MECHANICAENGINEERING
Class:- Second Year B. Tech. Sem:- IV
Course: - BSC-ME210 Applied Numerical Method

Course Outcomes:

1. Ability to solve problems on roots of equation and error.
2. Ability to solve linear and nonlinear problems.
3. Ability to solve mechanical engineering problem using numerical methods.
4. Ability to identify, classify numerical method for solving a problem.
5. Ability to choose the most appropriate numerical methods by using partial differential equations.
6. Ability to apply partial differential equation to solve practical problems with software.

Name of Department: - MECHANICAL ENGINEERING
Class:- Second Year B. Tech. Sem:- IV
Course: - BSC-ME217 Computer Graphics

Course Outcomes: After completion of course students are able to :

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 choose the different of curves and surfaces

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Name of Department: - MECHANICAL ENGINEERING
Class:- S.Y. B. Tech. Sem:- IV
Course: - BSC-ME216 Computer Aided Drafting

Course Outcomes:

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

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Name of Department:- MECHANICAL ENGINEERING
Class: - Second Year Sem: - IV
Course: -ENVIRONMENTAL STUDIES –
Upon completion of the course, students will be able to

1.Get acquainted with the scope and multidisciplinary nature of environmental science with the overall aim of sustainable development.

2.Understand the importance of ecosystems in the view of its conservation.

3. Know the values of natural resources with associated problems for sustainable Life styles.

4: Familiarize the basics of Biodiversity and concerned issues in the context of Western Ghats.

5: Make aware of the pollution issues with its mitigation measures.

6: Understand the social issues accompanied by environmental issues in the light of role of Indian culture and movements in conservation of the environment.

7: Recognize the significance of policies and legislation in environmental protection.

8: Acquire problem solving attitude through actual experiential learning in the form of field work and projects

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Name of Department: - MECHANICAL ENGINEERING
Class: - Second Year B. Tech. Sem:- IV
Course: - BSC-ME212 Fluid and Turbo Machinery

Course Outcomes:

1. Classify and understand working principle of rotodynamic machines and Reciprocating compressor.
2. Remember Euler's equation of rotodynamic machines
3. Remember Euler's equation of rotodynamic machines
4. Apply the theoretical knowledge to solve numerical problems, select the machines for particular application.
5. Analyze the machines to evaluate the performance.

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Name of Department: - MECHANICAL ENGINEERING
Class:- S.Y. B. Tech. Sem:- IV
Course: - BSC-ME214 Machine Tools and Processes

Course Outcomes: At the end of this course, student will be able to

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. In position to appreciate the merits of non-traditional machining and its applications in Industries.

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Name of Department: - MECHANICAENGINEERING
Class:- Second Year B. Tech. Sem:- IV
Course: - BSC-ME213 Theory of Machine I

Course Outcomes:

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.

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Name of Department: - MECHANICAL ENGINEERING
Class:- S. Y. B. Tech. Sem:- IV
Course: - BSC-ME215 Testing and Measurement Laboratory

Course Outcome:
1. Understand basic construction and working of various instruments
2. Select the various types of instruments for the measurement system

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Name of Department: - MECHANICAL ENGINEERING
Class:- Third Year B. Tech. Sem: - V
Course: - PCC-ME307 CAD/CAM Laboratory

Course Outcomes: At the end of this course, student will be able to

1.Understand and read engineering Drawings.
2.Prepare solid and surface models from 2D drawings.
3.Prepare assemblies and BOM.
4.Conversion of 3D Models into orthographic views.
5.Know the process of CAD data exchange between the software.
6.Understand the basics of Computer Aided Manufacturing.

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Name of Department: - MECHANICAL ENGINEERING
Class:-Third Year BTECH Sem:- V
Course: - PCC-ME301 Control Engineering

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1. To understand control system, its type and applications
2. To model physical system.
3. To determine system stability and system response.
4. To understand various control actions
5. To use MATLAB software to analyze control system

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Name of Department: - MECHANICAL ENGINEERING
Class: - Third Year B. Tech. Sem: - V
Course: - Enterprise Resource Planning

Course Outcomes:

1. Understand the structure of an ERP system and know how process chains in Material management, production, controlling and sales are implemented in an ERP system

2. Implementation and customize an ERP system using the appropriate modeling methods, that are Entity Relationship Modeling (ERM) and Event-Drive Process Chains (EPC)

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 a SAP.

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Name of Department: - MECHANICAL ENGINEERING
Class:- T.Y. B. Tech. Sem:- VI
Course: - PCC-ME303 Heat and Mass Transfer

Course Outcomes: At the end of this course, student will be able to

1. Formulate basic equations for heat transfer problems.
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 the solutions of heat transfer problems.
6. Evaluate the relative contributions of different modes of heat transfer

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Name of Department: - MECHANICAL ENGINEERING

Class:- Third Year B. Tech. Sem:- V

Course: - PCC-ME301 Machine Design-I

Course Outcomes:

1. Apply basic principles of machine design
2. Design machine elements on the basis of strength concept.
3. Use design data books and standard practices.
4. Select machine elements from Manufacturer's catalogue

Name of Department: - MECHANICAL ENGINEERING
Class:- Third Year B. Tech. Sem:- V
Course: - PCC-ME305 Manufacturing Engineering

Course Outcomes:

1.Understand various metal cutting technology including the process and measurement, etc.

2.Identify and select proper cutting tool with respect to work piece materials

3.Identify parameters of single and multipoint cutting tools.

4.Design and Draw Jig and Fixture.

5.Select and design dies for press working operations.

6.Understand and apply CNC Technology

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Name of Department: - MECHANICAENGINEERING
Class:-Third Year B. Tech. Sem:- V
Course: - PCC-ME302 Theory of Machine II

Course Outcomes:

1.Identify the various types of gears.

2.Select a gear drive for practical purpose.

3.Analyze the gyroscopic effects for practical life.

4.Solve a balancing problem.

5.Do the balancing of practical devices to reduce vibration.

6. Do force analysis of mechanisms

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Name of Department: - MECHANICAL ENGINEERING
Class:-T.Y.. B. Tech. Sem:- V
Course: - PCC-ME303 Workshop Practice V

Course Outcomes: At the end of this course, student will be able to

1. Select the suitable machining operations and prepare process sheet to manufacture a Component and Implement the same.

2. Control key dimensions on a component using principles of metrology and assembly To make any one assembly

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Name of Department: - MECHANICAL ENGINEERING
Class:- T.Y. B. Tech. Sem:- VI
Course: - PCC-ME317 Computer Integrated Manufacturing

Course Outcomes:

1.Locate modern techniques for integrating CAD/CIM in CIM

2.Obtain an overview of computer technology in Production Planning and Control including Computers

3.Apply classification and coding in Group Technology.

4.Elaborate Computer Aided Production Planning and Control

5.Generate CNC lathe part programming for turning ,facing, step turning, taper turning

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Name of Department: - MECHANICAL ENGINEERING
Class:- Third Year B. Tech. Sem:- VI
Course: - Electric Vehicle

Course Outcomes:

1.To understand the basic knowledge of electric vehicle technology.

2.To Select power sources for electric vehicles

3.To choose various configurations of an electric vehicle.

Name of Department: - MECHANICAL ENGINEERING
Class:- Third Year B. Tech. Sem:- VI
Course: - I C ENGINE

Course Outcomes:

1. Demonstrate engine construction, function of various parts of the engine and classify I.C.Engines.
2. Demonstrate combustion mechanism.
3. Demonstrate importance and functions of various systems on the engine.
4. Demonstrate need and methods of engine testing
5. Understand the impact of vehicular pollution and ways to reduce or control the pollution.

Name of Department: - MECHANICAL ENGINEERING
Class: - Third Year B. Tech. Sem:- VI
Course: - PCC-ME312 Industrial Fluid Power

Course Outcomes:

1.Do analysis of performance of Hydraulic and pneumatic system

2.Demonstrate Hydraulic and pneumatic system

3.Apply Hydraulic and pneumatic system fundamentals to industrial applications

4.Demonstrate knowledge about the fundamentals of Hydraulic and pneumatic system

Name of Department: - MECHANICAENGINEERING

Class:-Third Year B. Tech. Sem:- VI

Course: - PCC-ME311 Industrial Management and Operation research

Course Outcomes:

1.Understand the concepts of Industrial management and operations research approaches.

2.Formulate and solve engineering and managerial situations as LPP.

3.Formulate and solve engineering and managerial situations as Transportation and

4.Assignment problems.

5.Formulate and solve engineering and managerial situations as Decision theory, Network

6.model and Sequencing models

Name of Department: - MECHANICAL ENGINEERING
Class:- Third Year B. Tech. Sem:- VI
Course: - PCC-ME314 Machine Design-II

Course Outcomes:

1.Design machine elements subjected to fluctuating loading

2.Understand effect of tribological considerations on design

3.Select rolling contact bearings from manufacturer's catalogue.

4.Design sliding contact bearings used in various mechanical systems

5.Design various types of gears such as spur, helical, bevel and worm gear

Name of Department: - MECHANICAL ENGINEERING
Class:- Third Year B. Tech. Sem:- VI
Course: - PCC-ME313 Metrology and Quality Control

Course Outcomes: After completion of course students are able to :

1. Identify and use various measuring instruments and select appropriate instrument for particular feature measurement.
2. Distinguish and understand quality assurance and quality control. They can use control charts and sampling plans to manufacturing and service sector problems.
3. Learn advanced techniques of metrology in various industrial applications.
4. Prepare and understand drawings with general dimensions, tolerances and surface Finish.

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Name of Department: - MECHANICAL ENGINEERING
Class: T.Y. Mechanical SEM: VI
Course: PCC-ME319 Professional Skill Development

Course Outcomes (COs)

1.Effectively use techniques for self-awareness and self-development to increase confidence in abilities

2.Strengthen soft skills to achieve success in professional career

3.Smoothly transit from student life to professional life

4.Create professional documents using MS office tools

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Name of Department: - MECHANICAL ENGINEERING
Class:-T.Y.. B. Tech. Sem:- VI
Course: - PCC-ME318 Workshop Practice VI

Course Outcomes: At the end of this course, student will be able to

1. Select the suitable machining operations and prepare process sheet to manufacture aComponents and implement the same.
2. Control key dimensions on a component using principles of metrology and assembly

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Name of Department: - MECHANICAL ENGINEERING
Class:- Final Year B. Tech. Sem :- VII
Course: - PCC-ME404 Automobile Engineering (Elective –I)

Course Outcomes:

1. Explain components of automobile.
2. Distinguish various types of automobile lay outs as per drive given to wheels.
3. Identify types of automobile bodies and materials used for the same.
4. Demonstrate various automobile systems like clutch, gearbox final drive, brakes tearing suspension wheels and Tyres, and its construction and working.
5. Demonstrate various electrical and electronic systems like lighting, starting charging electronic controlled management system and its construction and working principle, sensors used in automobile
6. Solve the problems related with various resistances for the automobile, engine power calculation
7. Explain modern trends, techniques used in industries.

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Name of Department: - MECHANICAL ENGINEERING
Class:- Final Year B. Tech. Sem:- VII
Course: - PCC-ME303 Finite Element Analysis

**Course Outcomes:**

1. Elaborate the fundamental concepts of Finite Element method.
2. Understand the key concepts like Shape function, element stiffness and boundary conditions by finite element formulations for 1D problem.
3. Apply the finite element formulations for two dimensional problems using constant strain triangle
4. Demonstrate the modeling aspects of axisymmetric solids subjected to axisymmetric loading.
5 Apply the finite element formulations for Planer Trusses using 1D element.
6. Solve Scalar field problems by Finite element formulation.

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Name of Department: - MECHANICAL ENGINEERING
Class:- B.Tech. Sem:- VII
Course: - PCC-ME402 Mechanical System Design

Course Outcomes:

1. Understand the role of aesthetics, ergonomics and creativity in design.

2. Understand theories and principles used in design of pressure vessels. IC Engine and material handling equipment's.

3. Analyze and select suitable materials and design parameters during the design of pressure vessels, IC engine components, machine tool gear box and material handling systems as per industrial and societal requirement.

4. Evaluate the load carrying capacity, stress bearing capacity in various mechanical systems like unfired pressure vessels, IC engine components.

5. Design various mechanical systems like pressure vessels, machine tool gear boxes, material handling systems, etc. as per industrial and societal requirement.

6. Create the competency in mechanical system design by applying industrial design aspect

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Name of Department: - MECHANICAENGINEERING
Class:- Final Year B. Tech. Sem:- VII
Course: -PW ME 408 Project Phase I

Course Outcomes:

Upon successful completion of this course, the student will be able to

1. Improve the professional competency and research aptitude in relevant area.
2. Develop the work practice in students to apply theoretical and practical tools/techniques to solve real life problems related to industry and current research.

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Name of Department: - MECHANICAL ENGINEERING
Class:- B. Tech. Sem:- VII
Course: - PCC-ME 401 REFRIGERATION AND AIR CONDITIONING.

Course Outcomes: At the end of this course, student will be able to

1. Demonstrate an understanding of the need and importance of HVAC technology, the typical and some advanced and innovative schematic designs, and the goals of HVAC engineering and HVAC systems.
2. Demonstrate an understanding thermal comfort conditions with respect to temperature and humidity and human clothing and activities and its impact on human comfort, productivity, and health
3. Demonstrate an understanding of psychometrics and its application in HVAC engineering and design and will practice or observe psychometric measurements
4. Demonstrate an understanding of heat transfer in buildings with a given architectural design and its application to heating and cooling load estimation especially including thermal lag effects by conducting a detailed annual load analysis for a representative building and present the results of this analysis in a formal report possibly including recommendations for energy conservation.
5. Demonstrate an understanding of the engineering and operation of vapors compression and possibly heat-driven refrigeration systems and evaporative cooling systems and understand contemporary issues of ozone depletion and global warming potential with respect to refrigeration systems.

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Name of Department: - MECHANICAL ENGINEERING
Class:- B. Tech. Sem:- VII
Course: - PCC ME 406 Seminar

Course Outcomes:

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.

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Name of Department: - MECHANICAENGINEERING
Class:- B. Tech. Sem:- VII
Course: - SI ME 407 SUMMER INTERNSHIP

Course Outcomes:

1.Comprehend the knowledge gained in the course work

2.Create, select, learn and apply appropriate techniques, resources, and modern engineering tools.

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Name of Department: - MECHANICAL ENGINEERING
Class:- B. Tech. Sem:- VII
Course: - PCE ME Total Quality Management

Course Outcome:

1.Know the concept of total quality and the role of quality assurance.

2.Understand planning and controlling techniques for quality

3.Understand the key issues and some popular approaches to TQM implementation

4.Know the reliability approach for quality

5.Understand the current trends in TQM

Name of Department: - MECHANICAL ENGINEERING
Class:- B. Tech. Sem:- VIII
Course: - PCC ME 411 Energy and Power Engineering

Course Outcomes: At the end of this course, student will be able to

1. Analyze the utilization to estimate the potential of energy sources
2. Demonstrate need of different energy sources and their importance ms.
3. Illustrate power plant economics..
4. Comprehend various equipment's/systems utilized in power plants.

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Name of Department: - MECHANICAL ENGINEERING
Class:- B. Tech. Sem:- VIII
Course: -PCE ME 412 Industrial Automation & Robotics

Course Outcomes:

1. Design techniques for the analysis and control of discrete event system
2. Apply knowledge of automation tools and other equipment's for manufacturing and assembly
3. Components
4. Operate in research and development center for automation
5. Identify efficiencies and limitation and provide in depth evaluation of robotic system

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Name of Department: - MECHANICAL ENGINEERING
Class:- B. Tech. Sem:- VIII
Course: -PCE ME 413 Industrial Engineering

Course Outcome:

1. Manage and implement different concepts involved in methods study and understanding of work content in different situations.
2. Measure and estimate standard time for the job.
3. Understand different types of plant layouts.
4. Interpret job evaluation and merit rating.

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Name of Department: - MECHANICAL ENGINEERING
Class:-Final Year BTECH Sem:- VIII
Course: -PCC ME 409 Mechatronics

Course Outcomes:
Upon successful completion of this course, the student will be able to:

1 Develop a simulation model for simple physical systems and explain Mechatronics design Process.

2. Outline appropriate sensors and actuators for an engineering application

3. Write simple PLC programs

4. Explain various applications of design of Mechatronic systems

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Name of Department: - MECHANICAENGINEERING
Class:- B. Tech. Sem:- VIII
Course: - PCC ME 411 Noise and Vibration

**Course Outcomes:**

1.Understand relevance of noise in mechanical systems.

2.Carry out measurement of various vibration parameters.

3.Analyze vibratory response of mechanical element/system.

4.Estimate natural frequency of mechanical element/system.

5.Develop mathematical model to represent dynamic system

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Name of Department: - MECHANICAENGINEERING
Class:- B. Tech. Sem:- VIII
Course: - PCE ME 414*** Online Certificate Course

**Course Outcomes:**

1. Students will be able to choose course of their choice from Moodle/Swayam/MOOC/NPTEL. etc. and to be acquaintance with recent advance developments in Mechanical Engineering beyond syllabus.

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Name of Department: - MECHANICAENGINEERING
Class:- Final Year B. Tech. Sem:- VIII
Course: - PW ME 415 Project Phase II

Course Outcomes:

Upon successful completion of this course, the student will be able to

1 Improve the professional competency and research aptitude in relevant area.

2 Develop the work practice in students to apply theoretical and practical tools/techniques to solve real life problems related to industry and current research.