MECHANICAL ENGINEERING
SEMESTER PATTERN (CHOICE BASED CREDIT SYSTEM)

COURSE OUTCOMES

FIFTH :SEMESTER

5ME01 HEAT TRANSFER

Course Outcomes:

1. Apply the concept of heat transfer, laws of heat transfer and various mathematical equations.
2. Demonstrate the knowledge of determining the thermal conductivity of various materials.
3. Understanding and verifying various laws of radiation.
4. Capable to explain the concept of heat exchanger and demonstrate the calculations of efficiency.

5ME02 METROLOGY & QUALITY CONTROL

Course Outcomes:

1. Create & apply the concept of inspection, quality control and its importance to industry.
2. Demonstrate the skills of controlling various out of control processes using statistical quality
   control tools.
3. Understand the importance of improving production and productivity using work study
   approach.
4. Apply the knowledge of various measurement standards and techniques in the industry to measure various parameters related to metrology.

5ME03 KINEMATICS OF MACHINES

Course Outcomes:

Students will be able to-

1. Understand & apply the concept and its applications of link, mechanisms and machines.
2. Demonstrate the ability to analyze the mechanisms and machines on the basis of velocity and acceleration and they will show the ability to solve analytical methods.
3. Show the ability to use graphical and analytical methods for synthesis of mechanisms to develop mini projects in the course duration.
4. Understand the practical for study of brake, clutch, dynamometer, gear train etc.

5ME04 MEASUREMENT SYSTEMS

Course Outcomes:

1. Understand & apply the concept of measurement system and will know its importance related to the industry.
2. Demonstrate the ability to measure various parameters like pressure, flow, speed, vibration etc.
3. Understand to use various measuring instruments.
4. Understand the practical approach of engineering and will be confident in industry.

5ME05 OPEN ELECTIVE-I
(1) PRODUCTION MANAGEMENT

Course Outcomes:

1. Apply the knowledge of operations management and its applications in industrial environment.
2. Demonstrate the knowledge of advanced manufacturing technologies and philosophies.
3. Students will demonstrate the importance of inventory control, JIT in manufacturing.
4. Apply the basic concept of quality management, TQM etc.

5ME05 OPEN ELECTIVE-I
(2) MANUFACTURING TECHNIQUES

COURSE OUTCOMES:

1. Apply the knowledge of various manufacturing techniques and its applications in engineering.
2. Understand the knowledge of machining operations, sheet metal working and processes.
3. Students will show the ability to apply various joining methods in practice.
4. Students will exhibit the knowledge of powder metallurgy.

5ME06 HEATTRANSFER-LAB.

Course Outcome:

Upon successful completion of lab Course, student will be able to: i) Understand various modes of heat transfer and ii) evaluate various parameters of the heat transfer process

5ME07 METROLOGY & QUALITY CONTROL-LAB.

Course Outcome: Upon successful completion of lab Course, students will be able to

i) Explain the principles involved in measurement and inspection.
ii) Select and use appropriate measurement instrument for a given application
iii) Apply the basics of sampling in the context of manufacturing

5ME08 KINEMNATICS OF MACHINES - LAB.

Course Outcome: On successful completion of the course students will be able to:
Design linkage, cam and gear mechanisms for a given motion or a given input/output motion or force relationship, identify the basic relations between velocity & acceleration and use graphical and analytic methods to study the motions of various mechanisms

5ME09 MEASUREMENT SYSTEMS-LAB.

Course Outcome: Upon completion of this course students will be able to:

i) Choose appropriate measuring device for measurement of various quantities
ii) Analyse the performance of various
iii) Analyse and execute the calibration process for measuring instruments

SEMESTER : SIXTH

6ME01 DESIGN OF MACHINE ELEMENTS

COURSE OUTCOMES (COs):

1. Understand the concept of various stresses and apply the design procedure to riveted joints and welded joints.
2. Understand design procedure of knuckle joint, springs and power screw.
3. Analyze & select types of shafts, keys, couplings for various machines and industrial applications.
4. Analyze the various types of bearings and understand the design procedure of IC Engine parts.

6ME02 DYNAMICS OF MACHINES

Course Outcomes:

1. Apply basic concept of static force analysis and lubrication mechanism.
2. Understand the knowledge of dynamic force analysis analytically and graphically .
3. Apply the knowledge of space mechanism and vehicle dynamics.
4. Understand concept of free vibration and force vibration, concept of Torsional vibration.
5. Analyze the concept of balancing of machinery.

6ME03 CONTROL SYSTEM ENGINEERING

COURSE OUTCOMES:

1. Understand the basic system concept and study different types of systems.
2. Understand the concept Transient- Response analysis and will apply in numerical methods, the knowledge of basic control action and industrial controllers.
3. Understand the concept of Stability and exhibit the knowledge of root locus concept.
4. Understand the concept of Frequency Response method and use bode diagram in solving analytical problems.

ELECTIVE – I

6ME04 (2) NON-CONVENTIONAL ENERGY SYSTEMS

Course Outcomes (COs):

1. Able to study the concept of renewable and non-renewable sources.
2. Apply the basic concept of solar energy utilization and storage.
3. Apply the concept of energy from ocean and wind.
4. Study the concept of bio-mass energy resources.

6ME04 PROF. ELECTIVE I
(3) COMPUTER AIDED DESIGN & SIMULATION

Course Outcomes (COs):

1. Understand the concept of CAD/ CAM and CIM .
2. Apply knowledge using CAD modeling for component design
3. Apply the knowledge of geometric transformation.
4. Understand the Mechanical & Manufacturing simulation systems.

6ME06 DESIGN OF MACHINE ELEMENTS-LAB.

Course Outcome:

1. Design various machine elements like joints, springs, couplings etc., under various conditions
2. Convert design dimensions into working/manufacturing drawing
3. Use design data book/standard codes to standardize the designed dimensions

6ME07 DYNAMICS OF MACHINES -LAB.

Course Outcomes:

1. Apply basic concept of static force analysis and lubrication mechanism.
2. Understand the knowledge of dynamic force analysis analytically and graphically .
3. Apply the knowledge of space mechanism and vehicle dynamics.
4. Understand concept of free vibration and force vibration, concept of Torsional vibration.
5. Analyze the concept of balancing of machinery.

6ME08 PROF. ELECTIVE I – LAB
(3) CAD & SIMULATION

Course Outcomes (COs):

5. Understand the concept of CAD/ CAM and CIM .
6. Apply knowledge using CAD modeling for component design
7. Apply the knowledge of geometric transformation.
8. Understand the Mechanical & Manufacturing simulation systems.

6ME09 RESEARCH SKILLS – LAB

Course Outcome:

SEVENTH :SEMESTER

7ME01 MECHATRONICS

Course outcomes (CO):

1. Understand the concept of computer process control.
2. Create the working models for various mechatronics system for industrial applications.
3. Create mini projects on material handling systems like pick and place type robot, machine loading system etc.
4. Create pneumatic and hydraulic circuits for various industrial applications

7ME02 PRODUCTIVITY TECHNIQUES

Course Outcomes:

1. Understand Productivity.
2. Differentiate Method Study & Work Measurement.
3. Apply Ergonomics Principles.
4. Analyze Wedge payment & Incentive Plans.
5. Implement reengineering.
6. Understand different Maintenance methods.

7ME03 INDUSTRIAL MANAGEMENT & COSTING

Course Objectives (COs):

1. Understand the working of business environment.
2. Understand the management thoughts, its evolution and functions.
3. Apply standard and scientific techniques in materials management.
4. Evaluate time, costs, cost sheet and depreciation of industry

7ME04 ENERGY CONVERSION– II

Course Outcomes(CO):

1. Understand the working of different types of compressors.
2. Analyze, handle and resolve the problems related to working of air compressor.
3. Understand the principle of working of refrigeration systems, air conditioning and its applications.
4. Understand various nuclear reactions and issues related to working and maintenance of nuclear power generation.

7ME05 PROFESSIONAL ELECTIVE–II

(ii) AUTOMOBILE ENGINEERING

Course Outcomes (COs):

1. Understand the basics of automobile engineering and its components.
2. Idea creation of cooling system, electrical system and ignition system.
3. Analysis of transmission system and types of gears box.
4. Design and development of suspension and lubrication

7ME06 MECHATRONICS – LAB

Course Outcomes:

1 - Identification of key elements of mechatronics system and its representation in terms of block diagram.

2 - Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O .

3 - Interfacing of Sensors, Actuators using appropriate DAQ micro-controller.

4 - Time and Frequency domain analysis of system model (for control application).

5 - PID control implementation on real time systems.

6 - Development of PLC ladder programming and implementation of real life system.

7ME07 ENERGY CONVERSION II–LAB.

Course Outcomes: Students are able to

1. Understand the working of different types of compressors.
2. Analyze, handle and resolve the problems related to working of air compressor.
3. Understand the principle of working of refrigeration systems, air conditioning and its applications.
4. Understand various nuclear reactions and issues related to working and maintenance of nuclear power generation.

7ME08 PROFESSIONAL ELECTIVE–II

(ii) AUTOMOBILE ENGINEERING –Lab.

Course Outcomes (COs):

1. Apply basic principles and knowledge of automobile engineering and its components for proper functioning.
2. Analysis concept of cooling system, electrical system and ignition system.
3. Interpret basic concept of transmission system and types of gears box.
4. Remember the concept of suspension and lubrication.

SEMESTER:VIII

8ME01 OPERATION RESEARCH TECHNIQUES

Course Outcomes (CO):

1. Understand the knowledge of OR and OR models.
2. Analyze the transportation problems and related issues.
3. Understand the concept network models, CPM and PERT analysis.
4. Understand the concept replacement models and solve the problem on simulation techniques

8ME02 : I. C. ENGINES

Course Outcomes (COs):

1. Remember fundamentals of I.C. engines, their types and cycle analysis.
2. Remember the knowledge of fuels and alternative fuels, study of fuel injection pump.
3. Remember the concept of combustion of CI engine.
4. Understand the concept of supercharging its objectives, advantages and limitations.

8ME03 PROFESSIONAL ELECTIVE–III

(i) ENERGY CONSERVATION & MANAGEMENT

Course Outcome:

After learning the course the students should be able:

1. To understand the basic knowledge of different terms & principles of energy conservation, audit and management.
2. To Evaluate the energy saving & conservation in different mechanical utilities
3. To understand efficient heat & electricity utilization, saving and recovery in different thermal and electrical system.
5. To prepare energy audit report for different energy conservation instances.

8ME03 PROFESSIONAL ELECTIVE–III

(ii) RODUCTION PLANNING AND CONTROL

Course Outcomes (COs):

1. Understand the importance of production planning and control, its functions, advantages.
2. Apply the skills of calculating for sales forecasts using various forecasting methods.
3. Remember concept of machine capacity, loading of machines and man machine activity charts.
4. Understand concept of inventory control & various cases of inventory system and modern techniques/philosophies of management like CIM, JIT, MRP-I and MRP-II.

8ME04 PROFESSIONAL ELECTIVE – IV

(i) REFRIGERATION & AIR CONDITIOING

Course Outcomes:

1. Understand the fundamental basics of simple vapour compression system, types of refrigerant used in refrigeration system.

2. Understand the multistage pressure system, its types and elementary treatment of refrigeration system.

3. Apply the knowledge of refrigeration system and its controls, defrosting.

4. Apply the concept air conditioning system as winter, summer air conditioning system applications and its related issues.

8ME05 I.C.ENGINES - LAB.

Course Outcomes (COs):

1. Remember fundamentals of I.C. engines, their types and cycle analysis.

2. Apply the knowledge of a multi-cylinder petrol engine.

3. Evaluate performance of Engines by using heat balance sheet

4. Study of fuel injection pump and injectors

8ME06 PROFESSIONAL ELECTIVES -IV

(i) REFRIGERATION & AIR CONDITIONING-LAB.

Course Outcomes (CO):

1. Understand the fundamental basics of simple vapor compression system, types of refrigerant used in refrigeration system.

2. Apply the knowledge of different applications of refrigeration systems.

3. Apply the knowledge of refrigeration system and its controls, defrosting.

4. Apply the concept air conditioning system.