NM INSTITUTE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

THEORY COURSE OUTCOMES

BASIC MECHANICAL ENGINEERING
RBM1B101/ RBM1B102 (1st / 2nd SEMESTER)

Students will be able to:

CO1 Understand and analyze the basic concepts of thermodynamics

CO2 Acquire knowledge about properties of steam

CO3 Explain the basic concepts of applications of thermodynamics principles.

CO4 Understand the basic principles of power transmission device

CO5 Analyze the basics of robotics and its application in engineering

CO6 Able to understand about various mechanical measurement instruments

ENGINEERING MECHANICS
REM2B001 (2nd SEMESTER)

Students will be able to:

CO1 Remember the concept of equilibrium of concurrent forces in a plane

CO2 Understand the concept of frictional forces and predict the behavior of objects in contact with surfaces

CO3 Determine the center of mass and centroid of various objects, including composite bodies and also calculate moments of inertia for simple geometric shapes and use them to analyze rotational dynamics

CO4 Analyze internal forces in various members of a plane truss

CO5 Evaluate various unknown forces by using the concept of virtual work

CO6 Analyze impulse, momentum and apply the principle of conservation of momentum and energy in different scenarios including collisions

MECHANICS OF SOLID
RME3C001 (3rd SEMESTER)

Students will be able to:

CO1 Evaluate the strength of various structural element's internal forces such as compression, tension, shear, bending and torsion

CO2 Suggest suitable material from among those available in the field of construction and manufacturing

CO3 Evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts

CO4 Find out the deflection of members under various loading conditions

CO5 Understand the basic concept of analysis and design of structural elements such as columns and struts

CO6 Understand the basic concept of analysis and design of members subjected to torsion

FLUID MECHANICS AND HYDRAULIC MACHINES
RME3C002 (3rd SEMESTER)

Students will be able to:

CO1 Understand the various properties of fluids, their influence on fluid motion and analyze a variety of problems in fluid statics and dynamics

CO2 Calculate the forces that act on submerged planes and curves

CO3 Analyze various types of fluid flows

CO4 Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes

CO5 Measure the quantities of fluid flowing in pipes, tanks and channels

CO1 Solve kinematic problems such as finding particle paths and streamlines

KINEMATICS & DYNAMICS OF MACHINES

RME4C001 (4th SEMESTER)

Students will be able to:

CO1: Understand fundamentals of simple mechanisms, their inversions and their suitability for specific outputs

CO2: Analyze position, velocity and acceleration of linkages in mechanisms by graphical and analytical methods

CO3: Apply fundamentals of gear theory as a prerequisite for gear design

CO4: Estimate various forces and moments acting in reciprocating parts of an engine

CO5: Analyze the effect of friction in mechanical power transmission systems like clutch, belt, rope and chain drives

CO6: Understand working principles of several types of brakes and dynamometers

ENGINEERING THERMODYNAMICS

RME4C002 (4th SEMESTER)

Students will be able to:

CO1 Understand the concepts of first law of thermodynamics to identify closed and open systems

CO2 Apply the concept of second law of thermodynamics to understand fundamental concepts of unsteady flow, entropy generation and property relations

CO3 Develop a fundamental understanding of reversible work, energy balance and second law efficiency applied to various real life applications

CO4 Analyze the performance of gas and vapor power cycles and identify methods to improve thermodynamic performance

CO5 Solve problems based on the Brayton cycle; the Brayton cycle with regeneration; and the Brayton cycle with intercooling, reheating, and regeneration

CO6 Explain working principle of air compressors and their applications in engineering industry

INTRODUCTION TO PHYSICAL METALLURGY AND ENGINEERING MATERIALS

RME4C003 (4th SEMESTER)

Students will be able to:

CO1 Understand the basic structure, properties of metals, mechanism of crystallization and imperfections in crystals

CO2 Justify the materials behavior and their properties

CO3 Get basic foundation for learning material technology and understand the advances in the materials development

CO4 Acquire knowledge on properties and structure of ferrous and nonferrous alloys and to select suitable materials for various engineering applications

CO5 Analyze the various phase transformations in commonly used materials

CO6 Determine the reinforcement content in a polymer composite and analyze its effects on the overall performance of the composites

INTERNAL COMBUSTION ENGINES AND GAS TURBINES

RME4D001 (4th SEMESTER)

Students will be able to:

CO1 Understand various types of I.C. engines, cycles of operation and identify fuel metering, fuel supply systems for different types of engines

CO2 Understand combustion phenomena in SI and CI engines and analyze the effect of various operating variables on engine performance

CO3 Evaluate performance analysis of IC Engine and justify the suitability for different applications

CO4 Understand the conventional and non-conventional fuels and effects of emission formation of IC engines, its effects and the legislation standards

CO5 Express the ideal basic cycles and calculations involved in the operation of gas turbines and its application

CO6 Analyze the performance of a compressor

BASIC MANUFACTURING PROCESSES

RME5C001 (5th SEMESTER)

Students will be able to:

CO1 Know the various basic manufacturing processes used in industry for converting raw materials into finished products

CO2 Apply practical understanding to use different casting methods with their process details, application and limitations

CO3 Classify and explain in detail different welding methods with their brief introduction about brazing and soldering.

CO4 Understand the powder metallurgy process with its typical advantages, limitations and industrial applications

CO5 Differentiate between various metal forming process such as forging, hot and cold rolling process

CO6 Learn extrusion process, its types and use of sheet metal in making products

MECHANISMS AND MACHINES

RME5C002 (5th SEMESTER)

Students will be able to:

CO1 Explain different types of steering mechanisms

CO2 Analyze follower motions of cam and design cam profiles

CO3 Sketch turning moment diagrams for different types of engines and flywheels

CO4 Solve problems on governors and apply gyroscopic effect on aero planes, ships, two wheelers and four wheelers

CO5 Apply balancing concept on different types of engines

CO6 Determine natural frequency of vibratory systems using various methods

HEAT TRANSFER

RME5C003 (5th SEMESTER)

Students will be able to:

CO1 Remember the concept of different modes of heat transfer

CO2 Understand the concept of unsteady state heat conduction

CO3 Solve laminar and turbulent condition of external and internal heat flow

CO4 Analyze radiative heat transfer in non-absorbing medium

CO5 Evaluate the type of condensation using the correlations on various surfaces

CO6 Calculate overall heat transfer coefficient, fouling factor, LMTD and NTU analysis of heat exchanger

AUTOMOBILE ENGINEERING

RME5D001 (5th SEMESTER)

Students will be able to:

CO1 Analyze the basic concepts and working principles of various automobile components

CO2 Distinguish between various types of transmission systems and rear axles

CO3 Understand the principles of different gear boxes and gear geometry

CO4 Explain the need of various conventional and automatic steering and braking systems

CO5 Explain the electrical ignition system employed in automobile

CO6 Understand automotive electronics and study latest developments in automobiles

RAPID MANUFACTURING PROCESS

RME5D005 (5th SEMESTER)

Students will be able to:

CO1 Learn about the concepts of rapid tool processing and its applications

CO2 Learn and understand the basics of principles and strategies of automation in manufacturing systems

CO3 Develop a three-dimensional computer model of a mechanical system and fabricate an actual device via rapid prototyping

CO4 Implement proper automated material handling systems and integration of material handling and storage

CO5 Select the proper grouping of similar parts through group technology and developing automated process plans through computer aided process planning

CO6 Use appropriate tooling for rapid prototyping process and rapid prototyping techniques for reverse engineering

DESIGN OF MACHINE ELEMENTS

RME6C001 (6th SEMESTER)

Students will be able to:

CO1 Understand procedure of machine design and develop an ability to apply it for designing by using design data hand book

CO2 Understand different theories of failure and develop an ability to apply its knowledge for designing of mechanical component and determine the resisting areas against failure

CO3 Analyze the forces in welds and riveted joints and formulate design solution for size of weld and size of rivet

CO4 Understand the importance of design of keys, shafts and couplings

CO5 Acquire knowledge about designing helical springs

CO6 Apply the concept of different stress in various types of ball and roller bearing with designing of sliding contact bearings

MACHINING SCIENCE AND TECHNOLOGY

RME6C002 (6th SEMESTER)

Students will be able to:

CO1 Understand the cutting tool geometry, mechanism of chip formation and mechanics of orthogonal cutting

CO2 Identify basic parts and operations of machine tools including lathe, shaper, planer, drilling, boring, milling and grinding machine

CO3 Understand the importance of non-traditional machining processes and will be able to classify various processes

CO4 Gain thorough knowledge and evaluate tool geometry and tool materials

CO5 Know and appraising about advanced manufacturing processes

CO6 Follow certain advancements of finishing process like honing copying in the field of machining principles and machine tools

COMPUTER INTEGRATED MANUFACTURING AND FMS

RME6D003 (6th SEMESTER)

Students will be able to:

CO1 Understand the role of computer and automation in manufacturing

CO2 Describe automation, types of automation and automation strategies

CO3 Explain computer-based integration between various functions manufacturing, sales, design, and materials

CO4 Select suitable manufacturing method and implement proper rapid prototyping methods for designing particular components

CO5 Explain the concept of group technology, FMS, concurrent engineering, simulation and AI in CIM systems

CO6 Develop a flexible manufacturing system layout for given simple part family using group technology concepts and familiarize with computer aided process planning

POWER PLANT ENGINEERING

RME7D001 (7th SEMESTER)

Students will be able to:

CO1 Understand about power generation & various types of power plant.

CO2 Classify different types of steam generators and understand the importance of their mountings and accessories.

CO3 Evaluate flow through nozzles, analyze velocity diagram for impulse and reaction turbine

CO4 Calculate performance parameters of steam condensers & cooling towers

CO5 Compare working principles of nuclear reactors such as Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR) CANDU Reactor, Gas cooled Reactors, Liquid metal fast breeder Reactor

CO6 Analyze economics of power plant basic definitions, cost of electrical energy, types of tariff, and loads.

REFRIGERATION AND AIR CONDITIONING

RME7D005 (7th SEMESTER)

Students will be able to:

CO1 Apply the concepts of thermodynamics to solve problems related to air refrigeration cycles.

CO2 Analyze vapor compression refrigeration system and identify methods for performance improvement

CO3 Study the working principles of vapor absorption and thermoelectric refrigeration systems

CO4 Present the properties, applications and environmental issues of different refrigerants

CO5 Analyze the air conditioning processes using principles of psychometric

CO6 Evaluate cooling and heating loads in an air-conditioning system