



# RAAK

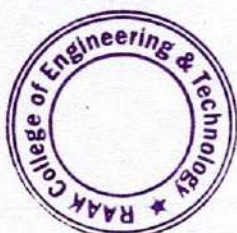
## COLLEGE OF ENGINEERING AND TECHNOLOGY

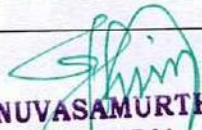
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DEPARTMENT OF MECHANICAL ENGINEERING  
SUBJECT WISE COURSE OUTCOME (2022 – 2023)

SUBJECT LIST  
(2013 -2014)

S. No.	Course Code	Course Name
1.	T101	Mathematics - I
2.	T102	Physics
3.	T103	Chemistry
4.	T104	Basic Electrical and Electronics Engineering
5.	T105	Engineering Thermodynamics
6.	T106	Computer Programming
7.	P101	Computer Programming Laboratory
8.	P102	Engineering Graphics
9.	P103	Basic Electrical and Electronics Laboratory
10.	T107	Mathematics - II
11.	T108	Material Science
12.	T109	Environmental Science
13.	T110	Basic Civil And Mechanical Engineering
14.	T111	Engineering Mechanics
15.	T112	Communicative English
16.	P104	Physics Laboratory
17.	P105	Chemistry Laboratory
18.	P106	Workshop Laboratory
19.	P107	NSS/NCC
20.	MA T31	Mathematics - III
21.	MET31	Mechanics of Solids
22.	MET32	Mechanics of Fluids
23.	MET33	Applied Thermodynamics
24.	MET34	Manufacturing process
25.	MET35	Electrical and Electronics Engineering



  
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26.	MEP31	Material Testing and Metallurgy Lab
27.	MEP32	Manufacturing Process Lab-1
28.	MEP33	Electrical And Electronics Lab
29.	MA T41	Mathematics - IV
30.	MET41	Engineering Metallurgy
31.	MET42	Fluid Machinery
32.	MET43	Kinematics of machinery
33.	MET44	Machine Drawing
34.	MET45	Machining Process
35.	MEP41	Fluid Mechanics And Machinery Lab
36.	MEP42	Manufacturing Process Lab-2
37.	MEP43	Computer Aided Machine Drawing Lab
38.	MEP44	Physical Education
39.	MET51	Dynamics of Machinery
40.	MET52	Design of Machine Element
41.	MET53	Metrology and Quality Control
42.	MET54	Heat and mass Transfer
43.	MET55	Mechanical Measurement
44.	MEE54	Industrial Casting Technology
45.	MEP51	Manufacturing Process Lab-3
46.	MEP52	Mechanical Measurement and Metrology Lab
47.	MEP53	Computational Method Lab
48.	MEP54	General proficiency Lab-1
49.	MET61	Operational Research
50.	MEP62	Design of Transmission System
51.	MEP63	Thermal Engineering
52.	MEP64	Computer Integrated Manufacturing
53.	MEP65	Control System Engineering
54.	MEE61	Automobile Engineering
55.	MEP61	Thermal Engineering Lab-1
56.	MEP62	Dynamics of Machine lab
57.	MEP63	Computational Fluid Dynamic Lab
58.	MEP64	General Proficiency Lab-2
59.	MET71	Computer Aided Design
60.	MET72	Industrial Engineering And Management
61.	MET73	Refrigeration , Air conditioning and Cryogenic engineering



*[Signature]*  
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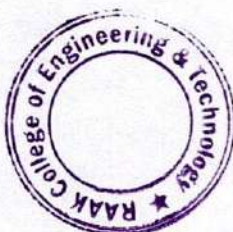
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I- SEMESTER

T101 Mathematics – I	
CO1	Apply knowledge of mathematics to solve functions of several variables
CO2	Identify, formulate and solve engineering problems like multiple integrals and their usage
CO3	To solve differential equation that model physical processes using effective mathematical tools
CO4	Able to find equation of straight line of shortest distance, equation of plane, angle between straight lines
CO5	Gain the knowledge to solve first order differential equation arising in engineering

T102 Physics	
CO1	Apply knowledge of science and engineering to understand physics and its significant contribution in the advancement of technology and invention of new products that dramatically transform modern day society
CO2	Identify different areas of physics which have direct relevance and application to different engineering disciplines
CO3	Apply fundamental knowledge to understanding applications of ultrasonics, optics and some optical devices, lasers and fiber optics, nuclear energy sources and wave mechanics
CO4	Understanding the basic operating principles of laser, its applications, optical fibre and its types, transmission characteristics, applications of optical fiber
CO5	Understanding the basic operating principles of laser, its applications, optical fibre and its types, transmission characteristics, applications of optical fibers

T103 Chemistry	
CO1	Apply knowledge of science and engineering to understand the importance of chemistry in engineering domain
CO2	Identify different electrochemical cells and their usage for industrial process
CO3	Apply fundamental knowledge of chemistry and build an interface of theoretical concepts with industrial applications engineering applications.
CO4	Guide the students to gain the knowledge about the cooling curves, phase diagrams, alloys and their practical importance
CO5	Strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with the industrial engineering applications



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### T104 – Basic Electrical And Electronics Engineering

CO1	Applying the kirchoff 's law , concept the series and parallel resistance , node , mesh analysis To solve dc circuit
CO2	Determine the average , RMS , form and peak factor of various waw form and the RL , RC and RLC series circuit
CO3	Explain the working principle of diode , Transistor , FET and analysis the characteristics curve
CO4	Also extend it on Rectifier , Amplifier , Oscillator application
CO5	Micro wave , Satellite , optical fiber and cellular mobile system

### T105 – Engineering Thermodynamics

CO1	Understand and apply the Thermodynamics principle in analyzing thermal system
CO2	Analyze energy and working interaction using the first law of thermodynamics
CO3	Explore the law of implication of system behavior including entropy
CO4	Evaluate gas power cycle for efficiency in engineering application
CO5	Analyze Refrigeration cycle and system for practical use

### T106 – Computer Programming

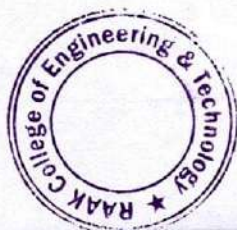
CO1	Know concept in problem solving
CO2	To do programming in c language
CO3	To write diversified solution using c language
CO4	To Know above the structure , pointer and its manipulation
CO5	To know about The evaluation of computer , components and its application

### P101 - Computer Programming Lab

CO1	Students can work with command line interface OS's like MS-Dos
CO2	Students can solve most of the real time problems with C Program
CO3	Students can interact with computer using C program, through various input and output functions.
CO4	Students can make a use of various keywords constants, variables, data types operators, type conversion in C programs.

### P102 – Engineering Graphics

CO1	Perform freehand sketching of basic geometrical constructions and multiple views of objects.
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CO2	Project orthographic projections of lines and plane surfaces.
CO3	Draw projections and solids and development of surfaces.
CO4	Visualize and to project isometric and perspective sections of simple solids
CO5	Students will be able to draw orthographic projections and isomeric projections.

P103 – Basic Electrical And Electronics Engineering Lab	
CO1	Know about basic electrical tools ,applications and precautions
CO2	Perform different types of wiring used in domestic and industrial applications
CO3	Measurements of voltage and phase using CRO, basic operations and applications of devices such as PN junction diode and transistors.
CO4	Understand the function and application of basic logic gates and flip flops
CO5	Gain knowledge in domestic wiring and application of electronics devices in the field of electrical engineering

### II- SEMESTER

T107 - Mathematics - II	
CO1	Apply knowledge of mathematics to solve matrix algebra technique for practical applications and curl, divergence and integration of vectors in vector calculus
CO2	Identify, formulate and solve engineering problems like laplace transform and to solve differential and integral equations
CO3	Apply formulae and analyze problems of fourier transform techniques
CO4	Determine the fourier transform , Fourier cosine and sine transform of elementary functions, properties of transforms and its application in engineering
CO5	Acquire knowledge of matrix algebra techniques, vector calculus, laplace and Fourier Transform

T108 - Material Science	
CO1	Apply core concept in material science to solve engineering problems
CO2	Knowledgeable of contemporary issues relevant to material science and engineering
CO3	Understand about ferrites and its application to magnetic materials
CO4	Select materials for design and construction
CO5	Understand the importance and properties of materials



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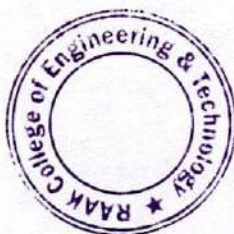
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T109 - Environmental Science	
CO1	Apply fundamental knowledge to understand about the environment
CO2	Identify environmental pollution through science
CO3	Apply basic knowledge to solve various environmental issues and problems
CO4	Ability to consider issues of environment and sustainable development in his personal and professional undertakings
CO5	Provide a comprehensive knowledge in environmental science, environmental issues and the management from an interdisciplinary perspective

T110 – Basic Civil & Mechanical Engineering	
CO1	Identify building types as per national code and comprehend construction material
CO2	Understand the building components , soil classification and basic infrastructure element
CO3	Grasp working principle of combustion system and boiler application
CO4	Analyze conventional and non conventional

T111 – Engineering Mechanics	
CO1	Understanding the force and movements for static Equilibrium
CO2	Apply the laws of motion and Kinematics
CO3	Solve the Practical problems with mechanics Concepts
CO4	Analyze the force System in Structural members
CO5	Apply the Kinematics and kinetics to particles and rigid bodies

T112 – Communicative English	
CO1	Learnt about the definition of communication, importance, concept. Sender, ideation, the levels in communication, channels, oral and return way of communication , body language and non verbal communication, accuracy, brevity and clarity, difference barriers for communication, techniques in making effective communication, listening importance and types of listening
CO2	Students learnt about the types of letters, report writing, notices and memo and also develop the skill in writing
CO3	Understands the comprehension, identifies the difference between skimming and scanning, guess the meaning of the words, identify to make notes.
CO4	Students learn the writing skills, how to write a paragraph in a proper manner four modes of writing and how to bibliographical entries
CO5	Students were able to develop their spoken skills by making many activities related to it



  
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P104 – Physics Lab	
CO1	Able to understand how to find the thickness of specimen and also to find the radius of curvature of glass using the phenomenon of two interference of light
CO2	Able to understand the specific rotary power of an optical active solution using the principle of polarization
CO3	To understand about the thermal conductivity of bad conductor and rubber tube
CO4	Ability to understand about the optical properties like dispersive power, resolving power by applying the knowledge of optics


P105 – Chemistry Lab	
CO1	Students will become well acquainted to test amount of hardness present in samples of water
CO2	Students will be efficient in estimating acidity/alkalinity in given samples
CO3	Students will have knowledge about estimating amount of dissolved oxygen in water
CO4	Students will become well acquainted to estimate copper in brass
CO5	Students will have knowledge about determination of viscosity of sucrose using Ostwalds's viscometer

P106 – Workshop Practice Lab	
CO1	To convey the basic of mechanical tools used in carpentry section and established hands on Training in making the different carpentry joint
CO2	To gain knowledge on types of tools and mechanics used in sheets metal shop and perform some exercise
CO3	To develop the basic welding and fitting joints using the hand tools and establish the importance of joints and fitting in engineering application
CO4	To gain knowledge of the different mechanics used in manufacturing process which are commonly employed in industry, to fabricate component using different material
CO5	To carry out simple manufacturing operation in lathe , drilling and shaping machine

### III- SEMESTER

MA T31 – Mathematics – III	
CO1	Familiarize with the concept of analytic function, C-R equations and its uses
CO2	Learn about Cauchy's theorem and its uses in complex integration. Taylor's and Laurent's series in complex form
CO3	Learn about Cauchy's Residues theorem and contour integrations



  
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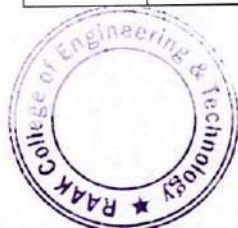
CO4	Gain knowledge of Finite and Infinite Fourier Transforms and applications
CO5	To introduce the route means fire value and parallel theorem on Fourier for practical applications

MET31 – Mechanics of Solids	
CO1	Analyze of material behavior , thermal stress and beam force for comprehensive structural insights
CO2	Master stress variation , normal/shear stresses and design principle for beams under bending force
CO3	Apply double intergration moment area , and strain energy method for accurate structural analyzes
CO4	Expertise in analysing torsion designing shaft and applying torsional concept to springs
CO5	Applying Euler's equation , Emperical formulae and understand the cylinder mechanics for robust structural design

MET32 - Mechanics and Fluids	
CO1	Analyze the fluid property , viscosity and hydrostatic forces on surface for understanding the fluid behaviour
CO2	Master fluid flow of principle , including stream lines velocity and beernoulli's equation for diberse application
CO3	Understand the viscous flow, viscosity measurement and , energy losses in pipies for efficient fluid transport design
CO4	Apply diamental analysis and model law such as Reynolds and Froude model for a systematic fluid dynamic problem solving

MET 33 – Applied Thermodynamics	
CO1	To understand the laws of perfect gases, state equation , gas mixture and pure substance property
CO2	To master 1 <sup>st</sup> and 2 <sup>nd</sup> laws of thermodynamics , energy balance and entropy principle
CO3	Ti introduce the energy reversible work , and assess energy, emphasizing the 2 <sup>nd</sup> law efficiency
CO4	To study the Maxwell equation , TDS equation and equilibrium condition for gases
CO5	To explore storichiometry adiabatic flame temperature , and availability in chemical reaction , emplasizing combustion analyais

MET34 – manufacturing Process	
CO1	Learn casting classification , steps , pattern/core making , molding tools , sand properties , remidie for defect
CO2	Explore welding process , including gases , are , resistance welding , addressing standards , defect and dissimilar material welding
CO3	Understand terminology and common defect in metal forming with rolling , forging , extrusion ,



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	drawing and sheet metal operating
CO4	Master various surface finishing technique , include honing , lapping , super finishing , abrasive belt finishing, polishing, buffing and graining
CO5	Explore plastic and polymers , covering structure , additive ,manufacturing , molding , machining , joining and industrial application

MET35 – Electrical And Electronic Engineering	
CO1	Grasp transformer essential , including EMF equation , equivalent circuit, voltage regulation , efficiency band auto transformer application
CO2	Master three phase induction motor theory , construction , starting , speed control, single phase induction motor , stepper motor and AC series motor application
CO3	Understand alternator construction , operating principle , phasor diagram , losses, efficiency and parallel operation
CO4	Learn operational Amplifier characteristics, application and filter design using differentiation , integration , instrumental amplifier and 555 IC
CO5	Explore IC advantages , study 555 IC pin configuration and design multivibrators, counters and multiplexer

MEP31 – Material Testing and Metallurgy laboratory	
CO1	Develop practical skills in analysing mechanical properties and behavior of material through hand on testing
CO2	Master three phase induction motor , construction , starting , speed control , single phase induction motor , stepper motor and AC series motor application
CO3	Understand alternator construction , operating principle , phaser diagram , losses , efficiency , parallel operation
CO4	Learn operational Amplifier characteristics, application and filter design using differentiation , integration , instrumental amplifier and 555 IC
CO5	Explore IC advantages , study 555 IC pin configuration and design multivibrators, counters and multiplexer

MEP32 – Manufacturing Process lab -1	
CO1	Comprehend principle and operation of lathe and shaping machine and milling machine for metal cutting
CO2	Acquire hands on skills in lathe operation including turning , fasing , grooving chamfering , knurling and V-thread cutting
CO3	Develop practical expertise in shaping Machine operation involving cube shapping and grooving
CO4	Attain proficiency in milling machine operation, covering cube milling and step milling
CO5	Applying knowledge and skill in taper turning on the lathe , demonstrating bersatiliuty in metal



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	shapping process
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MEP33 –Electrical And Electronic Lab	
CO1	Understand alternator construction , operating principle , phasor diagram , losses, efficiency and parallel operation
CO2	Master three phase induction motor , construction , starting , speed control , single phase induction motor , stepper motor and AC series motor application
CO3	Explore IC advantages , study 555 IC pin configuration and design multivibrators, counters and multiplexer

### IV- SEMESTER

MA T41 – Mathematics – IV	
CO1	Formulated solved partial differential equation
CO2	Derive and obtain the solution of wave equation and boundary value problems
CO3	Derive and obtain the solution of heat equation and boundary value problems
CO4	Apply least square method to fit various curves for the given data investigate the validity of hypothesis by z distribution techniques
CO5	Calculation of analysis of variance and explain the use of chi-squared test and its calculation

ME T41 – Engineering Metallurgy	
CO1	Acquire basic knowledge of material science concept , crystal structure , solid solution and metallurgy microscope
CO2	Construct and interrupt binary phase diagram comprehend iron /carbon equalbrium diagram and classify steel and alloy steel
CO3	Demonstrate knowledge of heat treatment process for steel , including critical temp, annealing normalizing harding and tempering
CO4	Understand the properties , application and manufacturing process of non-ferrous metal and alloy including copper , alluminium , nickel , zinc , lead based alloy
CO5	Analyze the plastic deformation , slip tinning ,and various working process , introduction to fracture mechanics , ductile to brittle transition and understanding of creep and fatigue fai

MET42 – Fluid Machinery	
CO1	Under the turbo machine , positive displacement pumps and application of impulse momentum and velocity triangles
CO2	Analyze the hydraulic turbine , including pelton wheels francis , Kaplan with velocity triangle and performance characteristic
CO3	Understand the hydraulic and centrifugal pump and reciprocating pump, considering power



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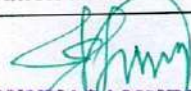
	estimation in governing mechanism
CO4	Explore air machine compressor, fan, including reciprocating, centrifugal, axial flow compressor, blower and fan

MET43 – Kinematics Of Machinery	
CO1	Understand kinematic chain element, mobility, application in mechanism and machine
CO2	Conduct kinematic analysis using instantaneous center and relative velocity method for planer mechanism
CO3	Learn graphical synthesis method for three point synthesis chebyshevs spacing
CO4	Analysing design cams with different profiles for varied cam followers configuration
CO5	Understanding gear classification, laws tooth profile, interference avoidance and gear ratio evaluation

MET44 – Machine Drawing	
CO1	Grasp conversion for sectioning, dimensioning and detailing the various mechanical components
CO2	Developing the proficiency in preparing the detail drawing for joint, coupling, bearing and various machine components
CO3	Apply fits and tolerance concept, machine, Symbol and geometric tolerance in components drawing
CO4	Demonstrate the ability to create assembly drawing for various joint, coupling, bearing and various machine components
CO5	Apply the drawing principle to represent and understand the design and assembly of mechanical components, joint and system

MET45 – Machining Process	
CO1	Understand the lathe operation including types, work holding, cutting parameter and, machine timing
CO2	Learn the basic machine operation on Shaping, planning and Slotting machine, along with the types and operation
CO3	Gain knowledge of milling operation. Including types, process, un conventional machine technique and machining types
CO4	Familiarize with cutting tools, material, geometric, mechanism, tools life and selection of cutting tools
CO5	Comprehend the drilling operation on various machin, covering operation and machining time



  
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MEP41 – Fluid Mechanics and Machinery Lab	
CO1	Understand the lathe operation including types , Reynolds and bernoullis theorem experiment
CO2	Proficiency calibration of flow measuring instruments like benturimeter , orificenter and rotometer
CO3	Practical knowledge determine performance and characteristics of pump and positive displacement pumps
CO4	Exploration of a turbine performance of characteristics , covering both reaction and impulse turbine

MEP42 – Manufacturing Processes Lab -2	
CO1	Comprehend principle and operation of lathe and shaping machine and milling machine for metal cutting
CO2	Acquire hands on skills in lathe operation including turning , fasing , grooving chamfering , knurling and V-thread cutting
CO3	Develop practical expertise in shaping Machine operation involving cube shapping and grooving
CO4	Attain proficiency in milling machine operation, covering cube milling and step milling
CO5	Applying knowledge and skill in taper turning on the lathe , demonstating bersatiliuty in metal shapping process

MEP43 – Computer Aided machine Drawing Lab	
CO1	Proficiency in utilizing the CAD , CAE software for designing and drawing machine components , creating 2d structure and understanding the permanent and temporary joints
CO2	Competence the drawing orthographic view for giving 3d blocks using auto CAD Screen icon and script files , demonstrating Skills in 2d representation
CO3	Ability to draw isometric view of object presented in orthographic view , enchancing visualization and spatial understanding
CO4	Application of draft Software for preparation of drawing for parts and Assembly of various components like gear coupling Safety valve , flange joint , hydraulic joint , etc
CO5	Skill Development in the preparation of production of drawing with tolerance limit and fit

MEP44 – Physical Education	
CO1	Understanding the opportunities of students physical, cognitive, social and emotional development
CO2	Understanding of individual and group motivation and behavior
CO3	To create teamwork among students and produce efficient result
CO4	The students were taught to operate advanced playing kits
CO5	To motivate the students to prepare the professional and scientific reports



  
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V- SEMESTER

MET51 – Dynamics of Machinery	
CO1	Understand the inertia forces , torque calculation in Slider crank mechanism and the functional role of fly wheel
CO2	Analyze the free force vibration , calculate the natural frequency for the longitudinal , transverse and torsional system and comprehend basic vibration isolation principle
CO3	Master analyze of transverse beam vibration, shaft whirling speed and comprehend torsional vibration causes and effects in rotor system
CO4	Gain proficiency in types of governor , characteristics and grasp gyroscopic effect and vehicle and machinery
CO5	Develop skills in static and dynamic skills balancing of rotating masses, applying partial balancing technique to reciprocating masses in various engine setup
MET52 – Design Of Machine Elements	
CO1	Explain design procedure and measure , properties and engineering material and the selection material design against static fluctuation load
CO2	Solve the design problem in different types of joint
CO3	Analyze the design problem related to the design of spring under different loading condition
CO4	Analyze the transmission shaft under keys under the different loading condition
CO5	Design problem related to clutches , brakes and selection of bearing from manufacturing catalogue
MET53 – Metrology and Quality control	
CO1	Recognize the importance of metrology in engineering design , manufacturing , and quality control
CO2	Understand the principle and application of comparators and its surface finished measurement technique
CO3	Acquire the knowledge of angular measurement screw thread metrology , gear metrology and advanced in metrology
CO4	Grasp in statistical quality control principle , acceptance sampling and various sampling plan
CO5	Learn about 6 sigma principle , quality standard and the application in manufacturing industries
MET54 – Heat and Mass Transfer	
CO1	Apply heat condition principle to solve steady state and transient problem
CO2	Analyze the forced convection, laminar/turbulent flow and transfer during phase change
CO3	Explain the thermal radiation , black body radiation and radioactive heat exchange
CO4	Analyze the double pipe heat exchange , understand factor affecting performance and evaluate effectiveness



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CO5	Regionalize the similarities, analyze diffusion, mass transfer and understand convective mass transfer
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MET55 – Mechanical Measurement	
CO1	Understand the principle of basic detector transducer element and signal conducting system for mechanical measurement
CO2	Ability to apply strain gauge pressure measurement including bourden gauges and thermo coupling and orificemeter
CO3	Proficiency , load cell and dyanamometer for measuring strain force , torque accurate
CO4	Skill in displacement and motion and measurement utilizing LVDT accelerometer and strodoscope along with analysing vibrating characteristis
CO5	Comprendency in utilizing digital technique for mechanical measurement and analyzing experiment data using representation methods on uncertainty analysis

MEE54 – Industrial Casting Technology	
CO1	Understand various casting technique for metal and plastic
CO2	Evaluate and selective suitable \casting process for specific application
CO3	Design gating and risering system for optimal casting quality
CO4	Apply advanced casting technology for involving manufacturing solution
CO5	Demonstrate competence in post casting process and quality control measure

MEP51 – Manufacturing Process Lab III	
CO1	Comprehend principle and operation of lathe and shaping machine and milling machine for metal cutting
CO2	Acquire hands on skills in lathe operation including turning , fasting , grooving chamfering , knurling and V-thread cutting
CO3	Develop practical expertise in shaping Machine operation involving cube shapping and grooving
CO4	Attain profiency in milling machine operation, covering cube milling and step milling
CO5	Applying knowledge and skill in taper turning on the lathe , demonstrating bersatiiliuty in metal shapping process

MEP52 – Mechanical Measurement And Metrology lab	
CO1	Understand the principle of basic detector transducer element and signal conducting system for mechanical measurement
CO2	Proficiency , load cell and dyanamometer for measuring strain force , torque accurate



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CO3	Comprehension in utilizing digital technique for mechanical measurement and analyzing experiment data using representation methods on uncertainty analysis
CO4	Skill in displacement and motion and measurement utilizing LVDT accelerometer and stroboscope along with analysing vibrating characteristic
CO5	Understand the application of the surface measurement technique for evaluating surface texture in engineering component

### MEP53 – Computational Method Lab

CO1	Understanding of numerical computational principle
CO2	Proficiency in implementation in numerical method for engineering problem solving
CO3	Competence in programming language like FORTRAN/C++, C or MATLAB
CO4	Ability to apply the numerical technique to find the solution for non-linear equation, linear system and differential equation
CO5	Skill in utilization of numerical integration and interpolation, optimization method in engineering analysis

### MEP54 – GENERAL PROFICIENCY

CO1	Improved communication and soft skills
CO2	Enhanced writing & speaking ability
CO3	Proficient in inter personal communication and leadership
CO4	Developed aptitude in verbal and numerical reasoning

### VI- SEMESTER

### MET61 – OPERATIONS RESEARCH

CO1	Understand linear programming concepts and applied methods like simplex and graphical techniques for optimization
CO2	Solve transportation and assignment problems using MODI method and transshipment models
CO3	Utilize dynamic programming to solve allocation, investment, and equipment replacement problem effectively
CO4	Apply inventory control models including EOQ, shortages, and price breaks to manage inventory efficiently
CO5	Analyze waiting line problems using queuing theory and develop logical flow charts for queuing models

### MET62 – DESIGN OF TRANSMISSION SYSTEM

CO1	Understand the principle and design consideration of various mechanical transmission system
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	including bearings , chains , ropes
CO2	Demonstrate proficiency in designing different types gears , including spur gears , helical gears , and bevel gears, based on bending & wear criteria
CO3	Apply knowledge of belt drive and chain drives to select and design appropriate flat and V-belts , roller chain , sprocket wheels for specific application
CO4	Analyze the advantages of gears drives over other transmission system & design gears boxes , speed reducers and stepped pulleys for different speeding requirement
CO5	Develop skills in geometric progression , ray diagrams and kinematics layout design sliding mesh gears boxes, constant mesh gear boxes and multi speed gear boxes

MET 63 - THERMAL ENGINEERING	
CO1	Understand internal combustion engine and there operation
CO2	Learn about fuels , combustion & emission control in engines
CO3	Grasp the fundamental of compressible fluid flow
CO4	Explore shock wave formation and its effect on flow
CO5	Gain insight into jet propulsion system and their performance

MET 64 – COMPUTER INTEGRATED MANUFACTURING	
CO1	Understand the principle and benefits of computer integrated manufacturing (CIM) its evolution , including the use of CIM in hardware and software
CO2	Gain knowledge of communication fundamentals and network architectures relevant to CIM , including data representation , coding , transmission and network topology
CO3	Acquire an understanding of product design concepts such as design for manufacturability , CAD/CAM integration , and concurrent engineering
CO4	Learn about manufacturing planning control techniques in CAM including process planning , production planning and quality management

MET65 – CONTROL SYSTEM ENGINEERING	
CO1	Understand fundamental principle and components of control system , including open loop And closed loop system
CO2	Developed proficiency in mathematical modeling techniques for various physical system , such as mechanical , thermal , fluid and electrical system
CO3	Analyze time domain response 1 <sup>st</sup> – order and 2 <sup>nd</sup> order system to different input signals and identify source of error
CO4	Apply knowledge stability criteria , such as routh – Hurwitz criterion and root locus analysis , to assess a stability of control system
CO5	Interrupt frequency response characteristics of control system using tools like bode plots and



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nyquist stability criterion
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MEP61-THERMAL ENGINEERING LAB	
CO1	Understand fuel properties and measurement principles
CO2	Learn air compressor and blower operation principles
CO3	Explore heat transfer modes and co efficient of determination
CO4	Analyze exhaust gas composition using or at apparatus
CO5	Evaluate heat exchanger performance to experiment

MEP62 - DYNAMICS OF MACHINES LAB	
CO1	Gain practical understanding of fuel properties and measurement principle
CO2	Learn working principle of governors and modes balancing
CO3	Acquire proficiency in vibration analysis and damping co efficient
CO4	Explore practical application of machines dynamics through experiment
CO5	Enhance analytical skills in gyroscopic effects , critical speed determination and gear profile generation

MEE 61 – AUTOMOBILE ENGINEERING	
CO1	Understanding chassis construction and vehicle classification
CO2	Analysis automobile layout using mobility principles
CO3	Evaluate different IC engine configuration based on engine kinematics
CO4	Comprehend transmission system component and function
CO5	Gain knowledge of automobile electrical system and component

MEP 63-COMPUTATIONAL FLUID DYNAMIC LAB	
CO1	Develop proficiency in computational fluid dynamic(CFD) and heat transfer analysis
CO2	Gain expertise in pre and post processing steps involved in CFD studies
CO3	Apply physics based simulation for computer aided designing and engineering task
CO4	Master grid generation and boundary condition set up for complex geometric in CFD simulation
CO5	Understand and implement multi physics simulation approaches for investigating various phenomenon



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MEP64-GENERAL PROFICIENCY	
CO1	Develop critical thinking and analyzing skill through passage and analysis terminology
CO2	Master writing communication with job application letter and resume writing
CO3	Enhance oral communication skill in group discussion, negotiation and interview
CO4	Proficient in inter personal communication and leadership
CO5	Developed aptitude in verbal and numerical reasoning

### VII- SEMESTER

MET71 – Computer Aided Design	
CO1	Understand the principle of graphics and apply them to computer aided drawing and modeling technique
CO2	Implement the bresenhan lines and circle algorithm for a efficient rendering
CO3	Apply the transformation in graphics including rotation , scaling translation and perspective projection
CO4	Utilize the various geometric modeling technique such as wire frame, surface and solid modeling to represent the complex shape and object
CO5	Demonstrate proficiency in CAD software package such as PRO-E , CATIA and SOLID-EDGE for parametric and variational modeling , feature based modeling and animation

MET72 – Industrial Engineering and Management	
CO1	Competently employee broad based analytic tools and computer for decision making and system design , analysis for performance
CO2	Assume managerial and leader ship rules in their chosen professional carrier while working un multi-disciplinary team
CO3	Engage in continuous learning by seeking out opportunities for the higher education or ongoing training related to the employment
CO4	Effectively adopt to the changing demand in work place and able to perform increasingly complex task

MET73 – Refrigeration ,Air conditioning and Cryogenic Engineering	
CO1	Grasps various refrigeration method and system including vapour compression and absorption and thermoelectric refrigeration
CO2	Develop skills in analyzing air properties using psychometric chart for efficient air conditioning system design
CO3	Learn to calculate cooling load considering heat source like conduction , solar radiation and occupy the effective air condition system



  
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MEE71 – Energy and Environmental Management	
CO1	Understand forming process and their parameter like temperature , speed and friction
CO2	Learn forging classification , die design , defect analysis
CO3	Explore rolling mill operation , estimation of load and power
CO4	Study direct extrusion , hydrostatic extraction and related stress analysis
CO5	Gain inside into drawing process , sheet metal forming technique and application

MEP71 – Thermal Engineering Lab -2	
CO1	Understand fuel properties and measurement principles
CO2	Learn air compressor and blower operation principles
CO3	Explore heat transfer modes and co efficient of determination
CO4	Analyze exhaust gas composition using or at apparatus
CO5	Evaluate heat exchanger performance to experiment

MEP72 – Computer Aided Engineering Lab	
CO1	Master CAD software for designing machine components
CO2	Excel in 3d modeling technique and assembly
CO3	Apply the FEA for stress and thermal analysis
CO4	Analysis truss for force , beam SF/BMD, stress concentration
CO5	Utilize CAD and FAD for the practical engg., problem solving

MEP73 – Comprehensive VIVA-VOCE	
CO1	Understand core mechanical engineering principle
CO2	Apply theory to solve object question effectively
CO3	Successfully complete internal assessment demonstrating comprehensive understanding
CO4	Excel in viva-voce showing depth of understanding
CO5	Exhibit confidence and communication skill in viva-voce

MEP74 – Industrial Visit And Training Report	
CO1	Gain insight in industrial operation
CO2	Understand diverse industrial process



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CO3	Acquire practical skill relevant to the field
CO4	Demonstrate effective communication report
CO5	Reflect critically on industrial learning experience

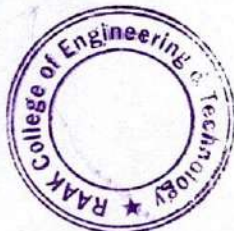
MEPW7 – Project Work (phase 1)	
CO1	Work effectively in group on project
CO2	Define clear problem statement
CO3	Develop problem solving method
CO4	Produce structure project report
CO5	Demonstrate understanding through evaluation

### VIII- SEMESTER

MET81 – Power Plant Engineering	
CO1	Grasp fundamental power generation
CO2	Understand power plant equipment and emission control
CO3	Gain insight into power plant economics and cost estimation
CO4	Analysis power plant performance and equipment selection
CO5	Conduct economic evaluation for power generation project

MEE81 – Advanced Welding Technique	
CO1	Comprehensive understanding of various welding technique
CO2	Knowledge of metal logical concept influence technique outcome
CO3	Proficiency in weld joint preparation , interpretation of welding symbol
CO4	Practical skill in conducting welding operation safely
CO5	Familiarity with testing and Inspection method to assist weld quality and compliance with standard

MEE85 – Maintenance and safety Engineering	
CO1	Use 7QCtools for data collection and analysis
CO2	Audit the quality system and take corrective action when necessary
CO3	Advice management for the TQM approach development



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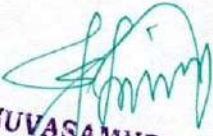
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CO4	Implement the TQM approach in a organization for continuous quality improvement
CO5	Asses where the organization stand on quality management with respect to various Quality standards

MEPW8 – Project Work (phase 2)**	
CO1	Work effectively in group on project
CO2	Define clear problem statement
CO3	Develop problem solving method
CO4	Produce structure project report
CO5	Demonstrate understanding through evaluation



  
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