



NPR College of Engineering and Technology

(AN AUTONOMOUS INSTITUTION)

NBA Accredited (B.E. - CSE, ECE, EEE & Mechanical Engg.) | Accredited by NAAC with 'A' Grade
Recognized by UGC under 2 (f) | ISO 9001:2015 Certified | Approved by All India Council for Technical Education, New Delhi
Affiliated to Anna University, Chennai

Natham, Dindigul (Dist.) - 624 401, Tamil Nadu.



Department of Mechanical Engineering

1. Course Code and Title

Anna University - Regulation 2021

Table 1.1 - List of Courses with Course Code

S/N.	COURSE CODE (NBA)	COURSE CODE (UNIVERSITY)	TITLE OF THE COURSE
Semester – I			
1.	C101	HS3152	Professional English - I
2.	C102	MA3151	Matrices and Calculus
3.	C103	PH3151	Engineering Physics
4.	C104	CY3151	Engineering Chemistry
5.	C105	GE3151	Problem Solving and Python Programming
6.	C106	GE3171	Problem Solving and Python Programming Laboratory
7.	C107	BS3171	Physics and Chemistry Laboratory
8.	C108	GE3172	English Laboratory
Semester – II			
9.	C109	HS3252	Professional English - II
10.	C110	MA3251	Statistics and Numerical Methods
11.	C111	PH3251	Materials Science
12.	C112	BE3251	Basic Electrical and Electronics Engineering
13.	C113	GE3251	Engineering Graphics
14.	C114	GE3271	Engineering Practices Laboratory
15.	C115	BE3271	Basic Electrical and Electronics Engineering Laboratory
16.	C116	GE3272	Communication Laboratory



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Semester – III			
17.	C201	MA3351	Transforms and Partial Differential Equations
18.	C202	ME3351	Engineering Mechanics
19.	C203	ME3391	Engineering Thermodynamics
20.	C204	CE3391	Fluid Mechanics and Machinery
21.	C205	ME3392	Engineering Materials and Metallurgy
22.	C206	ME3393	Manufacturing Processes
23.	C207	ME3381	Computer Aided Machine Drawing
24.	C208	ME3382	Manufacturing Technology Laboratory
25.	C209	GE3361	Professional Development
Semester – IV			
26.	C210	ME3491	Theory of Machines
27.	C211	ME3451	Thermal Engineering
28.	C212	ME3492	Hydraulics and Pneumatics
29.	C213	ME3493	Manufacturing Technology
30.	C214	CE3491	Strength of Materials
31.	C215	GE3451	Environmental Sciences and Sustainability
32.	C216	CE3481	Strength of Materials and Fluid Machinery Laboratory
33.	C217	ME3461	Thermal Engineering Laboratory
Semester – V			
34.	C301	ME3591	Design of Machine Elements
35.	C302	ME3592	Metrology and Measurements
36.	C303	MR3691	Robotics
37.	C304	CME380	Automobile Engineering
38.	C305	CME384	Power Plant Engineering
39.	C306	ME3581	Metrology and Dynamics Laboratory



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Semester – VI			
41	C307	ME3691	Heat and Mass Transfer
42	C308	CME387	Non-traditional Machining Processes
43	C309	CME340	CAD/CAM
44	C310	CME397	Surface Engineering
45	C311	CME366	Equipment for Pollution Control
46	C312	OCS352	IoT Concepts and Applications
47	C313	ME3681	CAD / CAM Laboratory
48	C314	ME3682	Heat Transfer Laboratory
Semester – VII			
49	C401	ME3791	Mechatronics and IoT
50	C402	ME3792	Computer Integrated Manufacturing
51	C403	GE3791	Human Values and Ethics
52	C404	GE3792	Industrial Management
53	C405	OCS353	Data Science Fundamentals
54	C406	OML351	Introduction to Non-Destructive Testing
55	C407	OIM353	Production Planning and Control
56	C408	ME3781	Mechatronics and IoT Laboratory
57	C409	ME3711	Summer Internship
Semester – VIII			
58	C410	ME3811	Project work / Internship

HoD / Mech

Principal



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Department of Mechanical Engineering

Course Outcomes with K – Level Mapping for all Courses (Regulation 2021)

SEMESTER 1

Course Code & Name: C101 & HS3152 Professional English - I		
	CO Statements	Knowledge Level
The students should be able to		
C101.1	Use appropriate words in a professional context	K3
C101.2	Gain understanding of basic grammatical structures and use them in right context.	K2
C101.3	Read and infer the denotative and connotative meanings of technical texts.	K2
C101.4	Read and interpret information presented in tables, charts and other graphic forms.	K2
C101.5	Write definitions, descriptions, narrations and essays on various topics.	K3

Course Code & Name: C102 & MA3151 Matrices and Calculus		
	CO Statements	Knowledge Level
The students should be able to		
C102.1	Use the matrix algebra methods for solving practical problems.	K3
C102.2	Apply differential calculus tools in solving various application problems.	K3
C102.3	Use differential calculus ideas on several variable functions.	K3
C102.4	Apply different methods of integration in solving practical problems.	K3
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3



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Course Code &Name: C103 & PH3151 Engineering Physics		
	CO Statements	Knowledge Level
The students should be able to		
C103.1	Understand the importance of mechanics.	K2
C103.2	Express their knowledge in electromagnetic waves.	K2
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics, lasers.	K2
C103.4	Understand the importance of quantum physics.	K2
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K3

Course Code &Name: C104 & CY3151 Engineering Chemistry		
	CO Statements	Knowledge Level
The students should be able to		
C104.1	Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K2
C104.2	Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K3
C104.3	Apply the knowledge of phase rule and composites for material selection requirements.	K3
C104.4	Recommend suitable fuels for engineering processes and applications.	K2
C104.5	Recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K3



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Course Code & Name: C105 & GE3151 Problem Solving and Python Programming

	CO Statements	Knowledge Level
The students should be able to		
C105.1	Develop algorithmic solutions to simple computational problems.	K3
C105.2	Develop and execute simple Python programs.	K3
C105.3	Write simple Python programs using conditionals and looping for solving problems.	K2
C105.4	Decompose a Python program into functions.	K4
C105.5	Represent compound data using Python lists, tuples, dictionaries etc.	K2
C105.6	Read and write data from/to files in Python programs.	K2

Course Code and Name: C106 & GE3171 Problem Solving and Python Programming Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C106.1	Develop algorithmic solutions to simple computational problems	K6
C106.2	Develop and execute simple Python programs.	K3
C106.3	Implement programs in Python using conditionals and loops for solving problems.	K3
C106.4	Deploy functions to decompose a Python program.	K2
C106.5	Process compound data using Python data structures.	K2
C106.6	Utilize Python packages in developing software applications.	K6



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Course Code and Name: C107 & BS3171 Physics and Chemistry Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C107.1	Discuss the functioning of various physics laboratory equipment.	K2
C107.2	Use graphical models to analyze laboratory data.	K3
C107.3	Analyse and determine the composition of alloys.	K3
C107.4	Learn simple method of synthesis of nanoparticles.	K4
C107.5	Analyse quantitatively the impurities in solution by electroanalytical techniques.	K3

Course Code and Name: C108 & GE3172 English Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C108.1	Listen to and comprehend general as well as complex academic information.	K2
C108.2	Listen to and understand different points of view in a discussion.	K2
C108.3	Speak fluently and accurately in formal and informal communicative contexts.	K3
C108.4	Describe products and processes and explain their uses and purposes clearly and accurately.	K2
C108.5	Express their opinions effectively in both formal and informal discussions.	K2



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SEMESTER 2

Course Code and Name: C109 & HS3252 Professional English -II

	CO Statements	Knowledge Level
The students should be able to		
C109.1	Compare and contrast products and ideas in technical texts.	K4
C109.2	Identify and report cause and effects in events, industrial processes through technical texts.	K2
C109.3	Analyse problems in order to arrive at feasible solutions and communicate them in the written format.	K4
C109.4	Present their ideas and opinions in a planned and logical manner.	K3
C109.5	Draft effective resumes in the context of job search.	K4

Course Code and Name: C110 & MA3251 Statistics and Numerical Methods

	CO Statements	Knowledge Level
The students should be able to		
C110.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
C110.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
C110.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K2
C110.4	Discuss various techniques and methods for solving first and second order ordinary differential equations.	K2
C110.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3



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Course Code and Name: C111 & PH3251 Materials Science

	CO Statements	Knowledge Level
The students should be able to		
C111.1	Know basics of crystallography and its importance for varied materials properties.	K2
C111.2	Gain knowledge on the electrical and magnetic properties of materials and their applications.	K2
C111.3	Comment clearly of semiconductor physics and functioning of semiconductor devices.	K2
C111.4	Discuss the optical properties of materials and working principles of various optical devices.	K2
C111.5	Appreciate the importance of functional nanoelectronic devices.	K3

Course Code and Name: C112 & BE3251 Basic Electrical and Electronics Engineering

	CO Statements	Knowledge Level
The students should be able to		
C112.1	Compute the electric circuit parameters for simple problems.	K3
C112.2	Explain the working principle and applications of electrical machines.	K2
C112.3	Analyze the characteristics of analog electronic devices.	K4
C112.4	Explain the basic concepts of digital electronics.	K2
C112.5	Explain the operating principles of measuring instruments.	K2



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Course Code and Name: C113 & GE3251 Engineering Graphics		
	CO Statements	Knowledge Level
The students should be able to		
C113.1	Use BIS conventions and specifications for engineering drawing.	K2
C113.2	Construct the conic curves, involutes and cycloid.	K3
C113.3	Solve practical problems involving projection of lines.	K3
C113.4	Draw the orthographic, isometric and perspective projections of simple solids.	K3
C113.5	Draw the development of simple solids.	K3

Course Code and Name: C114 & GE3271 Engineering Practices Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C114.1	Apply the knowledge of pipeline planning, plumbing fitting installation, wood sawing, planning, and joint making and execute common household plumbing and woodworking tasks.	K3
C114.2	Execute wiring of various electrical joints in common household electrical wire work.	K3
C114.3	Apply the knowledge of arc welding, machining, mechanical assembly, and sheet metal work, and create various functional household appliances	K3
C114.4	Apply the procedures for soldering and testing simple electronic circuits, as well as assembling and testing basic electronic components.	K3
C114.5	Apply the knowledge of pipeline planning, plumbing fitting installation, wood sawing, planning, and joint making and execute common household plumbing and woodworking tasks.	K3



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Course Code and Name: C115 & BE3271 Basic Electrical and Electronics Engineering Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C115.1	Use experimental methods to verify the Ohm's and Kirchhoff's laws.	K2
C115.2	Analyze experimentally the load characteristics of electrical machines.	K2
C115.3	Analyze the characteristics of basic electronics devices.	K2
C115.4	Use DSO to measure the various parameters.	K2
C115.5	Design, build, and test electronic circuits, including half-wave and full-wave rectifiers for power supply applications, as well as binary adder and subtractor circuits for digital arithmetic.	K4

Course Code and Name: C117 & GE3272 Communication Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C116.1	Speak effectively in group discussions held in a formal/semi formal contexts.	K2
C116.2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions.	K2
C116.3	Write emails, letters and effective job applications.	K2
C116.4	Write critical reports to convey data and information with clarity and precision.	K2
C116.5	Give appropriate instructions and recommendations for safe execution of tasks.	K3



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SEMESTER 3

Course Code and Name: C201 & MA3351 Transforms and Partial Differential Equations

	CO Statements	Knowledge Level
The students should be able to		
C201.1	Express how to solve the given standard partial differential equations.	K3
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	K3
C201.3	Appreciate the physical significance of Fourier series techniques in solving one- and two-dimensional heat flow problems and one-dimensional wave equations.	K2
C201.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.	K3
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems	K2

Course Code and Name: C202 & ME3351 – Engineering Mechanics

	CO Statements	Knowledge Level
The students should be able to		
C202.1	Illustrate the vector and scalar representation of forces and moments.	K2
C202.2	Analyse the rigid body in equilibrium.	K4
C202.3	Evaluate the properties of distributed forces.	K4
C202.4	Determine the friction and the effects by the laws of friction.	K3
C202.5	Calculate dynamic forces exerted in rigid body.	K4



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Course Code and Name: C203 & ME3391 Engineering Thermodynamics

	CO Statements	Knowledge Level
The students should be able to		
C203.1	Apply the zeroth and first law of thermodynamics by formulating temperature scales and calculating the property changes in closed and open engineering systems.	K3
C203.2	Apply the second law of thermodynamics in analysing the performance of thermal devices through energy and entropy calculations.	K3
C203.3	Apply the second law of thermodynamics in evaluating the various properties of steam through steam tables and Mollier chart	K3
C203.4	Apply the properties of pure substance in computing the macroscopic properties of ideal and real gases using gas laws and appropriate thermodynamic relations.	K3
C203.5	Apply the properties of gas mixtures in calculating the properties of gas mixtures and applying various thermodynamic relations to calculate property changes.	K3

Course Code and Name: C204 & CE3391 Fluid Mechanics and Machinery

	CO Statements	Knowledge Level
The students should be able to		
C204.1	Discuss the properties and behaviour in static conditions. Also, to understand the conservation laws applicable to fluids and its application through fluid kinematics and dynamics	K2
C204.2	Estimate losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel. Also, to understand the concept of boundary layer and its thickness on the flat solid surface.	K4
C204.3	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performances of prototype by model studies.	K4
C204.4	Explain the working principles of various turbines and design the various types of turbines.	K2
C204.5	Explain the working principles of centrifugal, reciprocating and rotary pumps and design the centrifugal and reciprocating pumps.	K2



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Course Code and Name: C205 & ME3392 Engineering Materials and Metallurgy

	CO Statements	Knowledge Level
The students should be able to		
C205.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.	K2
C205.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.	K2
C205.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals.	K2
C205.4	Summarize the properties and applications of non-metallic materials.	K2
C205.5	Explain the testing of mechanical properties.	K2

Course Code and Name: C206 & ME3393 Manufacturing Processes

	CO Statements	Knowledge Level
The students should be able to		
C206.1	Explain the principle of different metal casting processes.	K2
C206.2	Describe the various metal joining processes.	K2
C206.3	Illustrate the different bulk deformation processes.	K2
C206.4	Apply the various sheet metal forming process.	K3
C206.5	Apply suitable molding technique for manufacturing of plastic components.	K3



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Course Code and Name: C207 & ME3381 Computer Aided Machine Drawing

	CO Statements	Knowledge Level
The students should be able to		
C207.1	Apply standard drawing practices, including fits and tolerances, to ensure the accuracy and precision of technical drawings.	K3
C207.2	Model orthogonal views of machine components.	K3
C207.3	Prepare standard drawing layout for modeled parts, assemblies with BoM.	K3

Course Code and Name: C208 & ME3382 Manufacturing Technology Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C208.1	Demonstrate the safety precautions exercised in the mechanical workshop and join two metals using GMAW.	K3
C208.2	Make the green sand mould cavity.	K6
C208.3	Make the work piece as per given shape and size using machining process such as rolling, drawing, turning, shaping, drilling and milling.	K6
C208.4	Make the gears using gear making machines and perform grinding operation in different grinding machines	K6
C208.5	Calculate the cutting forces using dynamometer on machine tools.	K3



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Course Code and Name: C209 & GE3361 Professional Development		
	CO Statements	Knowledge Level
The students should be able to		
C209.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements	K3
C209.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding	K3
C209.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.	K3



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SEMESTER 4

Course Code and Name: C210 & ME3491 Theory of Machines

	CO Statements	Knowledge Level
The students should be able to		
C210.1	Discuss the basics of mechanism.	K3
C210.2	Solve problems on gears and gear trains.	K4
C201.3	Examine friction in machine elements.	K4
C201.4	Calculate static and dynamic forces of mechanisms.	K4
C210.5	Calculate the balancing masses and their locations of reciprocating and rotating masses. Computing the frequency of free vibration, forced vibration and damping coefficient.	K4

Course Code and Name: C211 & ME3451 Thermal Engineering

	CO Statements	Knowledge Level
The students should be able to		
C211.1	Apply thermodynamic concepts to different air standard cycles and solve problems.	K2
C211.2	Solve problems in steam nozzle and calculate critical pressure ratio.	K3
C211.3	Explain the flow in stream turbines, draw velocity diagrams, flow in Gas turbines, and solve problems.	K3
C211.4	Explain the functioning and features of IC engine, components, and auxiliaries.	K3
C211.5	Calculate the various performance parameters of IC engines.	K3



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Course Code and Name: C212 & ME3492 Hydraulics and Pneumatics

	CO Statements	Knowledge Level
The students should be able to		
C212.1	Apply the working principles of fluid power systems and hydraulic pumps.	K3
C212.2	Apply the working principles of hydraulic actuators and control components.	K3
C212.3	Design and develop hydraulic circuits and systems.	K4
C212.4	Apply the working principles of pneumatic circuits and power system and its components.	K3
C212.5	Identify various troubles shooting methods in fluid power systems.	K3

Course Code and Name: C213 & ME3493 Manufacturing Technology

	CO Statements	Knowledge Level
The students should be able to		
C213.1	Apply the mechanism of metal removal process and to identify the factors involved in improving machinability.	K3
C213.2	Describe the constructional and operational features of centre lathe and other special purpose lathes.	K2
C213.3	Describe the constructional and operational features of reciprocating machine tools.	K2
C213.4	Apply the constructional features and working principles of CNC machine tools.	K3
C213.5	Demonstrate the Program CNC machine tools through planning, writing codes and setting up CNC machine tools to manufacture a given component.	K3



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Course Code and Name: C214 & CE3491 Strength of Materials		
	CO Statements	Knowledge Level
The students should be able to		
C214.1	Explain the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.	K2
C214.2	Discuss the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.	K2
C214.3	Apply basic equation of torsion in designing of shafts and helical springs	K3
C214.4	Calculate slope and deflection in beams using different methods.	K4
C214.5	Analyze thin and thick shells for applied pressures.	K4

Course Code and Name: C215 & GE3451 Environmental Sciences and Sustainability		
	CO Statements	Knowledge Level
The students should be able to		
C215.1	Recognize and understand the functions of environment, ecosystems, and biodiversity and their conservation.	K2
C215.2	Identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K2
C215.3	Identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K3
C215.4	Recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K2
C215.5	Demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K3



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Course Code and Name: C216 & CE3491 Strength of Materials and Fluid Machinery Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C216.1	Determine the tensile, torsion and hardness properties of metals by testing.	K3
C216.2	Determine the stiffness properties of helical and carriage spring.	K3
C216.3	Apply the conservation laws to determine the coefficient of discharge of a venturimeter and finding the friction factor of given pipe.	K3
C216.4	Apply the fluid static and momentum principles to determine the metacentric height and forces due to impact of jet.	K3
C216.5	Determine the performance characteristics of turbine, rotodynamic pump and positive displacement pump.	K3

Course Code and Name: C217 & ME3461 Thermal Engineering Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C217.1	Evaluate performance characteristics of IC engines	K5
C217.2	Examine the viscous property of given lubricants.	K4
C217.3	Test to evaluate Performance and Energy Balance on a Steam Generator.	K4



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SEMESTER 5

Course Code and Name: C301 & ME3591 Design of Machine Elements

	CO Statements	Knowledge Level
The students should be able to		
C301.1	Explain the design machine members subjected to static and variable loads.	K2
C301.2	Apply the concepts design to shafts, key and couplings.	K3
C301.3	Apply the concepts of design to bolted, Knuckle, Cotter, riveted and welded joints.	K3
C301.4	Apply the concept of design helical, leaf springs, flywheels, connecting rods and crank shafts.	K3
C301.5	Apply the concepts of design and select sliding and rolling contact bearings, seals and gaskets.	K3

Course Code and Name: C302 & ME3592 Metrology and Measurements

	CO Statements	Knowledge Level
The students should be able to		
C302.1	Discuss the concepts of measurements to apply in various metrological instruments.	K2
C302.2	Apply the principle and applications of linear and angular measuring instruments, assembly, and transmission elements.	K3
C302.3	Apply the tolerance symbols and tolerance analysis for industrial applications.	K3
C302.4	Apply the principles and methods of form and surface metrology.	K3
C302.5	Apply the advances in measurements for quality control in manufacturing Industries.	K3



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Course Code and Name: C303 & MR3691 Robotics		
	CO Statements	Knowledge Level
The students should be able to		
C303.1	Apply the basic concepts and terminologies of robots.	K3
C303.2	Acquire the procedures for Forward and Inverse Kinematics, Dynamics for Various Robots.	K2
C303.3	Derive the Forward and Inverse Kinematics, Dynamics for Various Robots.	K3
C303.4	Explore the various programming techniques in industrial applications.	K2
C303.5	Analyze the use of various types of robots in different applications.	K4

Course Code and Name: C304 & CME380 Automobile Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C304.1	Discuss the forces required by various machine components to overcome inertia	K3
C304.2	Compute the unbalanced forces on reciprocating and rotating masses.	K3
C304.3	Distinguish the types of vibration and its effect on the system.	K3
C304.4	Associate the system response an exposure to various forced vibrations.	K3
C304.5	Explain the control mechanisms of governor and gyroscope with their applications.	K3



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Course Code and Name: C305 & CME384 Power Plant Engineering		
	CO Statements	Knowledge Level
The students should be able to		
C305.1	Explain the layout, construction and working of the components inside a thermal power plant.	K2
C305.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.	K2
C305.3	Explain the layout, construction and working of the components inside nuclear power plants.	K2
C305.4	Explain the layout, construction and working of the components inside Renewable energy power plants.	K2
C305.5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.	K2

Course Code and Name: C306 & ME3581 Metrology and Dynamics Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
C306.1	Perform calibration and measurements of linear/angular parameters, form parameters using linear/angular measuring instruments and roundness tester.	K5
C306.2	Measure the gear tooth parameters, screw thread parameters, surface finish parameters, prismatic component dimensions using appropriate measuring instruments	K5
C306.3	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipments.	K2
C306.4	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, balancing mass of rotating and reciprocating masses, and transmissibility ratio.	K3
C306.5	Determine the natural frequency and damping coefficient, critical speeds of shafts.	K3



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SEMESTER 7

Course Code and Name: C401 & ME3791 Mechatronics and IoT

	CO Statements	Knowledge Level
The students should be able to		
C401.1	Explain Select suitable sensors and actuators to develop mechatronics systems.	K3
C401.2	Discuss Devise proper signal conditioning circuit for mechatronics systems, and also able to implement PLC as a controller for an automated system.	K2
C401.3	Elucidate the fundamentals of IoT and Embedded Systems	K3
C401.4	Discuss Control I/O devices through Arduino and Raspberry Pi.	K3
C401.5	Design and develop an apt mechatronics/IoT based system for the given real-time application.	K3

Course Code and Name: C402 & ME3792 Computer Integrated Manufacturing

	CO Statements	Knowledge Level
The students should be able to		
C402.1	Discuss the basics of computer aided engineering	K5
C402.2	Choose appropriate automotive tools and material handling systems.	K2
C402.3	Discuss the overview of group technology, FMS and automation identification methods.	K4
C402.4	Design using computer aided process planning for manufacturing of various components	K2
C402.5	Acquire knowledge in computer process control techniques.	K4



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Course Code and Name: C403 & GE3791 Human Values and Ethics

	CO Statements	Knowledge Level
The students should be able to		
C403.1	Identify the importance of democratic, secular and scientific values in harmonious functioning of social life	K2
C403.2	Practice democratic and scientific values in both their personal and professional life.	K6
C403.3	Find rational solutions to social problems.	K2
C403.4	Behave in an ethical manner in society	K2
C403.5	Practice critical thinking and the pursuit of truth	K3

Course Code and Name: C404 & GE3792 Industrial Management

	CO Statements	Knowledge Level
The students should be able to		
C404.1	Explain basic concepts of management; approaches to management; contributors to management studies; various forms of business organization and trade unions function in professional organizations.	K2
C404.2	Discuss the planning; organizing and staffing functions of management in professional organization.	K4
C404.3	Apply the leading; controlling and decision making functions of management in professional organization.	K4
C404.4	Discuss the organizational theory in professional organization.	K4
C404.5	Apply principles of productivity and modern concepts in management in professional organization.	K4



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Course Code and Name: C405 & OCS353 Data Science Fundamentals		
	CO Statements	Knowledge Level
The students should be able to		
C405.1	Gain knowledge on data science process.	K2
C405.2	Perform data manipulation functions using Numpy and Pandas.	K2
C405.3	Understand different types of machine learning approaches.	K5
C405.4	Perform data visualization using tools.	K2
C405.5	Handle large volumes of data in practical scenarios.	K2

Course Code and Name: C406 & OML351 Introduction to Non-Destructive Testing		
	CO Statements	Knowledge Level
The students should be able to		
C406.1	Realize the importance of NDT in various engineering fields.	K2
C406.2	Have a basic knowledge of surface NDE techniques which enables to carry out various inspection in accordance with the established procedures.	K2
C406.3	Calibrate the instrument and inspect for in-service damage in the components by means of Eddy current testing as well as Thermography testing.	K5
C406.4	Differentiate various techniques of UT and AET and select appropriate NDT methods for better evaluation.	K3
C406.5	Interpret the results of Radiography testing and also have the ability to analyse the influence of various parameters on the testing.	K4



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Course Code and Name: C407 & OIM353 Production Planning and Control

	CO Statements	Knowledge Level
The students should be able to		
C407.1	The students can able to prepare production planning and control act work study,	K4
C407.2	The students can able to prepare product planning,	K2
C407.3	The students can able to prepare production scheduling,	K6
C407.4	The students can able to prepare Inventory Control.	K2
C407.5	They can plan manufacturing requirements manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP)	K2

Course Code and Name: C408 & ME3781 Mechatronics and IoT Laboratory

	CO Statements	Knowledge Level
The students should be able to		
C408.1	Demonstrate the functioning of mechatronics systems with various pneumatic, hydraulic and electrical systems	K4
C408.2	Demonstrate the microcontroller and PLC as controllers in automation systems by executing proper interfacing of I/O devices and programming	K5
C408.3	Demonstrate the sensing and actuation of mechatronics elements using IoT.	K4



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SEMESTER 8

Course Code and Name: C410 & ME3811 Project Work

	CO Statements	Knowledge Level
The students should be able to		
C410.1	Formulate a real-world problem, identify the requirement and develop the design solutions.	K3
C410.2	Identify technical ideas, strategies, and methodologies.	K3
C410.3	Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.	K3
C410.4	Test and validate through conformance of the developed prototype and analysis the cost effectiveness.	K4
C410.5	Prepare technical report and oral presentations	K3