



NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY



Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Vadapudupatti, Annanji (po), Theni - 625 531,
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DEPARTMENT OF COS

S.NO	YEAR/S EM	COURSE NAME	COURSE CODE	COURSE OUTCOME
1	1/1	HS8151 COMMUNICATIVE ENGLISH	C101.1	Read articles of a general kind in magazines and newspapers.
			C101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
			C101.3	Comprehend conversations and short talks delivered in English
			C101.4	Write short essays of a general kind and personal letters and emails in English
2		MA8151 ENGINEERING MATHEMATICS - I	C102.1	Use both the limit definition and rules of differentiation to differentiate functions.
			C102.2	Apply differentiation to solve maxima and minima problems.
			C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus
			C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables
			C102.5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
			C102.6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
			C102.7	Apply various techniques in solving differential equations
			C103.1	The students will gain knowledge on the basics of properties of matter and its applications.



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3	1/1	PH8151 ENGINEERING PHYSICS	C103.2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics.
			C103.3	The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers.
			C103.4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes
			C103.5	The students will understand the basics of crystals, their structures and different crystal growth techniques.
4		CY8151 ENGINEERING CHEMISTRY	C104.1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
5		GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING	C105.1	Develop algorithmic solutions to simple computational problems
			C105.2	Read, write, execute by hand simple Python programs.
			C105.3	Structure simple Python programs for solving problems
			C105.4	Decompose a Python program into functions.
			C105.5	Represent compound data using Python lists, tuples, dictionaries.
			C105.6	Read and write data from/to files in Python Programs.
			C106.1	Familiarize with the fundamentals and standards of Engineering graphics



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6	1/1	GE8152 ENGINEERING GRAPHICS	C106.2	Perform freehand sketching of basic geometrical constructions and multiple views of objects.
			C106.3	Project orthographic projections of lines and plane surfaces.
			C106.4	Draw projections and solids and development of surfaces.
			C106.5	Visualize and to project isometric and perspective sections of simple solids.
7		GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	C107.1	Write, test, and debug simple Python programs.
			C107.2	Implement Python programs with conditionals and loops
			C107.3	Develop Python programs step-wise by defining functions and calling them.
			C107.4	Use Python lists, tuples, dictionaries for representing compound data.
			C107.5	Read and write data from/to files in Python.
8	I/I	BS8161 PHYSICS AND CHEMISTRY LABORATORY	C108.1	Apply principles of elasticity, optics and thermal properties for engineering applications.
9		HS8251 TECHNICAL ENGLISH	C201.1	Read technical texts and write area- specific texts effortlessly.
			C201.2	Listen and comprehend lectures and talks in their area of specialisation successfully.
			C201.3	Speak appropriately and effectively in varied formal and informal contexts
			C201.4	Write reports and winning job applications.
	I/II	MA8251	C202.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
			C202.2	Gradient, divergence and curl of a vector point function and



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10		ENGINEERING MATHEMATICS - II		related identities.
			C202.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
			C202.4	Analytic functions, conformal mapping and complex integration.
			C202.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
11		PH8251 MATERIALS SCIENCE	C203.1	the students will have knowledge on the various phase diagrams and their applications
			C203.2	the students will acquire knowledge on Fe-Fe ₃ C phase diagram, various microstructures and alloys
			C203.3	the students will get knowledge on mechanical properties of materials and their measurement
			C203.4	the students will gain knowledge on magnetic, dielectric and superconducting properties of materials
			C203.5	the students will understand the basics of ceramics, composites and nanomaterials.
12	I/II	BE8253 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATIO N ENGINEERING	C204.1	Understand electric circuits and working principles of electrical machines
			C204.2	Understand the concepts of various electronic devices
			C204.3	Choose appropriate instruments for electrical measurement for a specific application
			C205.1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain



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13		GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING		knowledge on the following after completing the course.
			C205.2	Public awareness of environmental is at infant stage.
			C205.3	Ignorance and incomplete knowledge has lead to misconceptions
			C205.4	Development and improvement in std. of living has lead to serious environmental disasters
14		GE8292 ENGINEERING MECHANICS	C206.1	illustrate the vectorial and scalar representation of forces and moments
			C206.2	analyse the rigid body in equilibrium
			C206.3	evaluate the properties of surfaces and solids
			C206.4	calculate dynamic forces exerted in rigid body
			C206.5	determine the friction and the effects by the laws of friction
15	I/II	GE8261 ENGINEERING PRACTICES LABORATORY	C207.1	Fabricate carpentry components and pipe connections including plumbing works.
			C207.2	Use welding equipments to join the structures
			C207.3	Carry out the basic machining operations
			C207.4	Make the models using sheet metal works
			C207.5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings
			C207.6	Carry out basic home electrical works and appliances
			C207.7	Measure the electrical quantities
			C207.8	Elaborate on the components, gates, soldering practices
16		BE8261 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATIO N ENGINEERING LABORATORY	C208.1	Ability to determine the speed characteristic of different electrical machines
			C208.2	Ability to design simple circuits involving diodes and transistors
			C208.3	Ability to use operational



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				amplifiers
17		MA8353 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	C301.1	Understand how to solve the given standard partial differential equations.
			C301.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
			C301.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
			C301.4	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.
			C301.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
18		ME8391 ENGINEERING THERMODYNAMIC S	C302.1	Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions.
			C302.2	Apply second law of thermodynamics to open and closed systems and calculate entropy and availability.
			C302.3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods
			C302.4	Derive simple thermodynamic relations of ideal and real gases
			C302.5	Calculate the properties of gas mixtures and moist air and its use in psychometric processes
	II/III		C303.1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.



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19		CE8394 FLUID MECHANICS AND MACHINERY	C303.2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks
			C303.3	Can mathematically predict the nature of physical quantities
			C303.4	Can critically analyse the performance of pumps
			C303.5	Can critically analyse the performance of turbines.
20		ME8351 MANUFACTURING TECHNOLOGY - I	C304.1	Explain different metal casting processes, associated defects, merits and demerits
			C304.2	Compare different metal joining processes.
			C304.3	Summarize various hot working and cold working methods of metals.
			C304.4	Explain various sheet metal making processes.
			C304.5	Distinguish various methods of manufacturing plastic components.
21		EE8353 ELECTRICAL DRIVES AND CONTROLS	C305.1	Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance
22	II/III	ME8361 MANUFACTURING TECHNOLOGY LABORATORY - I	C306.1	Demonstrate the safety precautions exercised in the mechanical workshop.
			C306.2	Make the workpiece as per given shape and size using Lathe.
			C306.3	Join two metals using arc welding.
			C306.4	Use sheet metal fabrication tools and make simple tray and funnel.
			C306.5	Use different moulding tools, patterns and prepare sand moulds.
23		ME8381 COMPUTER AIDED MACHINE	C307.1	Follow the drawing standards, Fits and Tolerances
				Re-create part drawings,



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		DRAWING	C307.2	sectional views and assembly drawings as per standards
24		EE8361 ELECTRICAL ENGINEERING LABORATORY	C308.1	Ability to perform speed characteristic of different electrical machine
25		HS8381 INTERPERSONAL SKILLS / LISTENING & SPEAKING	C309.1	Listen and respond appropriately.
			C309.2	Participate in group discussions
			C309.3	Make effective presentations
			C309.4	Participate confidently and appropriately in conversations both formal and informal
26	II/IV	MA8452 STATISTICS AND NUMERICAL METHODS	C401.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
			C401.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture
			C401.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
			C401.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
			C401.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications
27		ME8492 KINEMATICS OF MACHINERY	C402.1	Discuss the basics of mechanism
			C402.2	Calculate velocity and acceleration in simple mechanisms
			C402.3	Develop CAM profiles
			C402.4	Solve problems on gears and gear trains
			C402.5	Examine friction in machine



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				elements
28	II/IV	ME8451 MANUFACTURING TECHNOLOGY – II	C403.1	Explain the mechanism of material removal processes.
			C403.2	Describe the constructional and operational features of centre lathe and other special purpose lathes.
			C403.3	Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines.
			C403.4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes.
			C403.5	Summarize numerical control of machine tools and write a part program.
29	II/IV	ME8491 ENGINEERING METALLURGY	C404.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.
			C404.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
			C404.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals
			C404.4	Summarize the properties and applications of non metallic materials.
			C404.5	Explain the testing of mechanical properties. .
30	II/IV	CE8395 STRENGTH OF MATERIALS FOR MECHANICAL ENGINEERS	C405.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.
			C405.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
			C405.3	Apply basic equation of simple torsion in designing of shafts



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	II/IV			and helical spring
			C405.4	Calculate the slope and deflection in beams using different methods.
			C405.5	Analyze and design thin and thick shells for the applied internal and external pressures.
31		ME8493 THERMAL ENGINEERING- I	C406.1	Apply thermodynamic concepts to different air standard cycles and solve problems.
			C406.3	Solve problems in single stage and multistage air compressors
			C406.3	Explain the functioning and features of IC engines, components and auxiliaries.
			C406.4	Calculate performance parameters of IC Engines.
			C406.5	Explain the flow in Gas turbines and solve problems.
32		ME8462 MANUFACTURING TECHNOLOGY LABORATORY – II	C407.1	use different machine tools to manufacturing gears
			C407.2	Ability to use different machine tools to manufacturing gears.
			C407.3	Ability to use different machine tools for finishing operations
			C407.4	Ability to manufacture tools using cutter grinder
			C407.5	Develop CNC part programming
33		CE8381 STRENGTH OF MATERIALS AND FLUID MECHANICS AND MACHINERY LABORATORY	C408.1	Ability to perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials.
34		HS8461 ADVANCED READING AND WRITING	C409.1	Write different types of essays
			C409.2	Write winning job applications.
			C409.3	Read and evaluate texts critically.
			C409.4	Display critical thinking in various professional contexts.
			C501.1	Solve problems in Steam Nozzle
				Explain the functioning and features of different types of



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35	III/V	ME8595 THERMAL ENGINEERING- II	C501.2	Boilers and auxiliaries and calculate performance parameters
			C501.3	Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems.
			C501.4	Summarize the concept of Cogeneration, Working features of Heat pumps and Heat exchangers
			C501.5	Solve problems using refrigerant table / charts and psychrometric charts
36		ME8593 DESIGN OF MACHINE ELEMENTS	C502.1	Explain the influence of steady and variable stresses in machine component design.
			C502.2	Apply the concepts of design to shafts, keys and couplings.
			C502.3	Apply the concepts of design to temporary and permanent joints.
			C502.4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.
			C502.5	Apply the concepts of design to bearings.
37	III/V	ME8501 METROLOGY AND MEASUREMENTS	C503.1	Describe the concepts of measurements to apply in various metrological instruments
			C503.2	Outline the principles of linear and angular measurement tools used for industrial applications
			C503.3	Explain the procedure for conducting computer aided inspection
			C503.4	Demonstrate the techniques of form measurement used for industrial components
			C503.5	Discuss various measuring techniques of mechanical properties in industrial applications
			C504.1	Calculate static and dynamic



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38		ME8594 DYNAMICS OF MACHINES		forces of mechanisms.
			C504.2	Calculate the balancing masses and their locations of reciprocating and rotating masses.
			C504.3	Compute the frequency of free vibration.
			C504.4	Compute the frequency of forced vibration and damping coefficient.
		C504.5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes.	
39		OAI553 PRODUCTION TECHNOLOGY OF AGRICULTURAL MACHINERY	C505.1	Upon completion of this course, the students can able to apply the different manufacturing process and use this in industry for component production.
40	III/V	ME8511 KINEMATICS AND DYNAMICS	C506.1	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipments.
			C506.2	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency and damping coefficient, torsional frequency, critical speeds of shafts, balancing mass of rotating and reciprocating masses, and transmissibility ratio.
41		ME8512 THERMAL ENGINEERING LABORATORY	C507.1	conduct tests on heat conduction apparatus and evaluate thermal conductivity of materials.
			C507.2	conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.
			C507.3	conduct tests on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.



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			C507.4	conduct tests to evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.
			C507.5	conduct tests to evaluate the performance of refrigeration and airconditioning test rigs.
42		ME8513 METROLOGY AND MEASUREMENTS LABORATORY	C508.1	Measure the gear tooth dimensions, angle using sine bar, straightness and flatness, thread parameters, temperature using thermocouple, force, displacement, torque and vibration.
			C508.2	Calibrate the vernier, micrometer and slip gauges and setting up the comparator for the inspection
43		ME8651 DESIGN OF TRANSMISSION SYSTEMS	C601.1	apply the concepts of design to belts, chains and rope drives.
			C601.2	apply the concepts of design to spur, helical gears.
			C601.3	apply the concepts of design to worm and bevel gears.
			C601.4	apply the concepts of design to gear boxes .
			C601.5	apply the concepts of design to cams, brakes and clutches
44	III/VI	ME8691 COMPUTER AIDED DESIGN AND MANUFACTURING	C602.1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics
			C602.2	Explain the fundamentals of parametric curves, surfaces and Solids
			C602.3	Summarize the different types of Standard systems used in CAD
			C602.4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines
			C602.5	Summarize the different types of techniques used in Cellular Manufacturing and FMS



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45		ME8693 HEAT AND MASS TRANSFER	C603.1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems
			C603.2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems
			C603.3	Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems
			C603.4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems
			C603.5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications
46	III/VI	ME8692 FINITE ELEMENT ANALYSIS	C604.1	Summarize the basics of finite element formulation.
			C604.2	Apply finite element formulations to solve one dimensional Problems.
			C604.3	Apply finite element formulations to solve two dimensional scalar Problems.
			C604.4	Apply finite element method to solve two dimensional Vector problems.
			C604.5	Apply finite element method to solve problems on iso parametric element and dynamic Problems.
			C605.1	Explain the Fluid power and operation of different types of pumps.
				Summarize the features and



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47		ME8694 HYDRAULICS AND PNEUMATICS	C605.2	functions of Hydraulic motors, actuators and Flow control valves
			C605.3	Explain the different types of Hydraulic circuits and systems
			C605.4	Explain the working of different pneumatic circuits and systems
			C605.5	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.
48		PR8592 WELDING TECHNOLOGY	C606.1	Understand the construction and working principles of gas and arc welding process.
			C606.2	Understand the construction and working principles of resistance welding process.
			C606.3	Understand the construction and working principles of various solid state welding process.
			C606.4	Understand the construction and working principles of various special welding processes.
			C606.5	Understand the concepts on weld joint design, weldability and testing of weldments.
49		ME8681 CAD / CAM LABORATORY	C607.1	Draw 3D and Assembly drawing using CAD software
			C607.2	Demonstrate manual part programming with G and M codes using CAM
50	IV/VII	ME8682 DESIGN AND FABRICATION PROJECT	C608.1	design and Fabricate the machine element or the mechanical product.
C608.2			demonstrate the working model of the machine element or the mechanical product.	
51		HS8581 PROFESSIONAL COMMUNICATION	C608.1	Make effective presentations
			C608.2	Participate confidently in Group Discussions.
			C608.3	Attend job interviews and be successful in them.
			C608.4	Develop adequate Soft Skills



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				required for the workplace
52		ME8792 POWER PLANT ENGINEERING	C701.1	Explain the layout, construction and working of the components inside a thermal power plant.
			C701.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants
			C701.3	Explain the layout, construction and working of the components inside nuclear power plants.
			C701.4	Explain the layout, construction and working of the components inside Renewable energy power plants.
			C701.5	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.
53		ME8793 PROCESS PLANNING AND COST ESTIMATION	C702.1	select the process, equipment and tools for various industrial products.
			C702.2	prepare process planning activity chart.
			C702.3	explain the concept of cost estimation.
			C702.4	compute the job order cost for different type of shop floor.
			C702.5	calculate the machining time for various machining operations.
54	IV/VII	ME8791 MECHATRONICS	C703.1	Discuss the interdisciplinary applications of Electronics, Electrical, Mechanical and Computer Systems for the Control of Mechanical, Electronic Systems and sensor technology.
			C703.2	Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing Modes of Microprocessor and Microcontroller.
				Discuss Programmable



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			C703.3	Peripheral Interface, Architecture of 8255 PPI, and various device interfacing
			C703.4	Explain the architecture, programming and application of programmable logic controllers to problems and challenges in the areas of Mechatronic engineering.
			C703.5	Discuss various Actuators and Mechatronics system using the knowledge and skills acquired through the course and also from the given case studies
55		OML751 TESTING OF MATERIALS	C704.1	Identify suitable testing technique to inspect industrial component
			C704.2	Ability to use the different technique and know its applications and limitations
56		OMF751 LEAN SIX SIGMA	C705.1	The student would be able to relate the tools and techniques of lean sigma to increase productivity
57	IV/VII	ME8073 UNCONVENTIONAL MACHINING PROCESSES	C706.2	Explain the need for unconventional machining processes and its classification
			C706.3	Compare various thermal energy and electrical energy based unconventional machining processes.
			C706.4	Summarize various chemical and electro-chemical energy based unconventional machining processes.
			C706.5	Explain various nano abrasives based unconventional machining processes.
			C706.2	Distinguish various recent trends based unconventional machining processes.
				On completion of this course, students will learn about a working principle and construction of Additive Manufacturing technologies,



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58	IV/VII	MF8071 ADDITIVE MANUFACTURING	C707.1	their potential to support design and manufacturing, modern development in additive manufacturing process and case studies relevant to mass customized manufacturing.
59		ME8097 NON DESTRUCTIVE TESTING AND EVALUATION	C708.1	Explain the fundamental concepts of NDT
			C708.2	Discuss the different methods of NDE
			C708.3	Explain the concept of Thermography and Eddy current testing
			C708.4	Explain the concept of Ultrasonic Testing and Acoustic Emission
			C708.5	Explain the concept of Radiography
60		GE8074 HUMAN RIGHTS	C709.1	Engineering students will acquire the basic knowledge of human rights.
61		ME8711 SIMULATION AND ANALYSIS	C710.1	simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder and cam follower mechanisms using MATLAB.
			C710.2	analyze the stresses and strains induced in plates, brackets and beams and heat transfer problems.
			C710.3	calculate the natural frequency and mode shape analysis of 2D components
62		ME8781 MECHATRONICS LABORATORY	C711.1	Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic and electrical systems.
			C711.2	Demonstrate the functioning of control systems with the help of PLC and microcontrollers.
			ME8712	C712.1
	C712.2			To employ different skills in preparing detailed report describing the project and



NADAR SARASWATHI COLLEGE OF ENGINEERING & TECHNOLOGY



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Tamilnadu, India.

63		TECHNICAL SEMINAR		results
			C712.3	To review the research articles for understanding of a new field, in the absence of a textbook
			C712.1	To improve the technical communication by making an oral presentation before an evaluation committee
			C712.2	To cite the reference sources as per research ethics
64	IV/VIII	MG8591 PRINCIPLES OF MANAGEMENT	C713.1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management
65		MG8091 ENTREPRENEURSH IP DEVELOPMENT	C714.1	Upon completion of the course, students will be able to gain knowledge and skills needed to run a business successfully.
66		ME8811 PROJECT WORK	C715.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.