Department of Mechanical Engineering

Year & Sem: I-I **Regulation:** R20

Course Name: Linear Algebra and Calculus		**Course Code:** 20A54101
1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications	
2	Utilize mean value theorems to real life problems	
3	Familiarize with functions of several variables which is useful in optimization	
4	Students will also learn important tools of calculus in higher dimensions.	
5	Students will become familiar with 3- dimensional coordinate system	

Course Name: Engineering Chemistry		**Course Code:** 20A51201T
1	Experiment and apply the principles of electro chemical changes and choose better designs to solve problems related to it.	
2	Identify engineering materials with distinguished properties to construct high rated products.	
3	Experiment,analyze and report the level of hardness in water and select appropriate method to solve water related problems.	
4	Test and rate the fuels comparing calorific values and observe fuels at different combustion conditions.	
5	Apply the surface phenomenon and sketch the phase diagram to assess and describe heterogeneous systems.	

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Course Name: C-Programming & Data Structures		**Course Code:** 20A05201T
1	To illustrate the basic concepts of C programming language.	
2	To discuss the concepts of Functions, Arrays, Pointers and Structures.	
3	To familiarize with Stack, Queue and Linked lists data structures.	
4	To explain the concepts of non-linear data structures like graphs and trees.	
5	To learn different types of searching and sorting techniques.	

Course Name: Basic Electrical & Electronics Engineering		**Course Code:** 20A02101T
1	Explain the theory, construction, and operation of electronic devices.	
2	Apply the concept of science and mathematics to explain the working of diodes and its applications, working of transistor and to solve the simple problems based on the applications	
3	Distinguish features of different active devices including Microprocessors.	
4	Analyze small signal amplifier circuits to find the amplifier parameters	
5	Design small signal amplifiers using proper biasing circuits to fix up proper Q point.	

Course Name: Engineering Workshop		**Course Code:** 20A03202
1	Apply wood working skills in real world applications.	
2	Build different objects with metal sheets in real world applications.	
3	Apply fitting operations in various applications.	
4	Apply different types of basic electric circuit connections.	
5	Use soldering and brazing techniques.	

Course Name: IT WORKSHOP		**Course Code: 20A05202**
1	Disassemble and Assemble a Personal Computer and prepare the computer ready to use.	
2	Prepare the Documents using Word processors and Prepare spread sheets for calculations	
3	using excel and also the documents using LAteX.	
4	Prepare Slide presentations using the presentation tool.	
5	Interconnect two or more computers for information sharing.	

Course Name: Engineering Chemistry Lab		**Course Code: 20A51201P**
1	determine the cell constant and conductance of solutions	
2	prepare advanced polymer materials (L2	
3	determine the physical properties like surface tension, adsorption and viscosity	
4	estimate the Iron and Calcium in cement	
5	calculate the hardness of water	

Course Name: : C-Programming & Data Structures Lab		**Course Code:** 20A05201P
1	Demonstrate basic concepts of C programming language.	
2	Develop C programs using functions, arrays, structures and pointers	
3	Illustrate the concepts Stacks and Queues	
4	Design operations on Linked lists	
5	Apply various Binary tree traversal techniques	
6	Develop searching and sorting methods.	

Year & Sem: II-I **Regulation:** R19

Course Name: Complex Variables, Transforms and PDE		**Course Code:** 19A54301
1	Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper	
2	Understand the analyticity of complex functions and conformal mappings. Formulate/solve/classify the solutions of Partial differential equations and also find	
3	Evaluate the Fourier series expansion of periodic functions	
4	Understand the usage of Laplace Transforms	
5	integrals along contours. the solution of one dimensional wave equation and heat	

	equation.

Course Name: Python Programming	**Course Code:** 19A05304T
1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.(TL2)
2	Demonstrate proficiency in handling Strings and File Systems.(TL3)
3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.(TL3)
4	Illustrate Programs using Regular Expressions.(TL4)
5	Interpret the concepts of Object-Oriented Programming as used in Python(TL2)

Course Name: Manufacturing Processes	**Course Code:** 19A03301T
1	Demonstrate different metal casting processes and gating systems.
2	Classify working of various welding processes.
3	Evaluate the forces and power requirements in rolling process.
4	Apply the principles of various forging operations.
5	Outline the manufacturing methods of plastics, ceramics and powder metallurgy

Course Name: Engineering Mechanics	**Course Code:** 19A03302
1	Analyze the basic concepts of rigid bodies subjected to different types of loads and supports.
2	Analyze the motion of the bodies considering friction and external loads.
3	Determine centroids, centre of gravity and area moment of inertia and mass moment of inertia of simple and composite figures.
4	Analyze the perfect frames using method of joints, method of sections & tension coefficient method for vertical , horizontal and inclined loads.
5	Analyse the motion of particle with & without considering forces.

Course Name: MATERIAL SCIENCE AND ENGINEERING		**Course Code:** 19A03303T
1	Explain the principles of binary phases.	
2	Select steels and cast irons for a given application.	
3	Apply heat treatment to different applications.	
4	Utilize nonferrous metals and alloys in engineering.	
5	Choose composites for various applications.	

Course Name: Design Thinking & Product Innovation		**Course Code:** 19A99303T
1	explain the historical developments in mechanical, electrical, communications and	
2	summarize the importance of basic sciences in product development	
3	identify new materials and manufacturing methods in design	
4	apply systematic approach to innovative designs	
5	computational engineering	

Course Name: Universal Human Values		**Course Code:** 19A52301
1	Students are expected to become more aware of themselves, and their surroundings They would become more responsible in life, and in handling problems with	
2	(family, society, nature) They would also become sensitive to their commitment towards what they have	
3	They would have better critical ability.	

4	sustainable solutions, while keeping human relationships and human nature in mind. It is hoped that they would be able to apply what they have learnt to their own self in
5	understood (human values, human relationship and human society). different day-to-day settings in real life, at least a beginning would be made in this direction.

Course Name: Design Thinking & Product Innovation Lab		**Course Code:** 19A99303P
1	To develop 3D models using 3D printing	
2	To design the system with measuring devices	
3	Design hydraulic / pneumatic circuits	

Course Name: Manufacturing Processes Lab		**Course Code:** 19A03301P
1	Fabricate different types of components using various manufacturing techniques	
2	Adapt unconventional manufacturing methods.	

Course Name: Material Science and Engineering Lab		**Course Code:** 19A03303P
1	Evaluate hardness of treated and untreated steels	
2	Importance of hardening of steels	
3	Visualize grains and grain boundaries	
4	Identify various microstructures of ferrous and non-ferrous metals and alloys	

Course Name: Environmental Sciences		**Course Code:** 19A99301
1	Grasp multidisciplinary nature of environmental studies and various renewable and Understand various causes of pollution and solid waste management and related preventive.	
2	Understand flow and bio-geo- chemical cycles and ecological pyramids	

3	. nonrenewable resources. About the rainwater harvesting, watershed management, ozone layer depletion and waste
4	measures. Casus of population explosion, value education and welfare programmes land reclamation

Year & Sem: III-I **Regulation:** R15

Course Name: Fluid Mechanics and Hydraulic Machines	**Course Code:** 15A01510
1	Understand the basic principles of fluid flow.
2	Recognize the particular flow regime present in a typical engineering system.
3	Identify, formulate and solve engineering problems related to hydraulic machines.
4	Understand concept of Hydraulic pumps.

Course Name: Thermal Engineering - II	**Course Code:** 15A03501
1	Understand the crystal structures of materials, defects and correlating the structure with the properties.
2	Understand the concept of solid solutions and interpret different type of phase diagrams.
3	Understand different types of Heat treatment techniques.
4	Acquire knowledge on ferrous non-ferrous alloys.
5	Understand the importance and application of composite and ceramic materials.

Course Name: Dynamics of Machinery	**Course Code:** 15A03502
1	Understand the importance of gyroscope.

2	Analyse the planar mechanisms under forces and synthesis of linkages.
3	Demonstrate the working of clutches, fly wheels and governors.
4	Use effective methods of balancing of masses.
5	Understand the concept of vibrations.

Course Name: Machine Tools	**Course Code:** 15A03503
1	Understand the role of the method of metal cutting for surface finish.
2	Understand the working of various machine tools like lathe, milling machine etc.
3	Understand the difference between various surface finishing operations.
4	Design various clamping and work holding devices.

Course Name: Design of Machine Members	**Course Code:** 15A03504
1	Understand concept of simple and complex stresses.
2	To analyze and design basic machine elements in mechanical systems.
3	Study the effect of fatigue loading and various failure theories.
4	Design riveted, bolted and axially loaded joints.
5	Design of shafts, keys, shaft couplings and mechanical springs.

Course Name: Entrepreneurship	**Course Code:** 15A03505
1	By the end of the course, a student is able to hone entrepreneurial problem-solving and decision-making skills.
2	The student is able to explore the opportunities for establishing and managing startups

Course Name: Fluid Mechanics and Hydraulic Machines Laboratory		**Course Code:** 15A01511
1	Determine the coefficient of discharge of Venturimeter and Orifice meter.	
2	Determine the coefficient of discharge for a Small Orifice ,External Mouth piece & Notches	
3	Determine the coefficient of Loss of head in a Sudden Contraction and Friction Factor.	
4	Verify the Bernoulli's equation.	
5	Determine the coefficient of Impact of jet on vanes.	

Course Name: Machine Tools Laboratory		**Course Code:** 15A03508
1	Able to operate lathe machine to perform plain turning, step turning, knurling, threading, eccentric turning, chamfering and facing.	
2	Practice drilling holes and produce internal threads.	
3	Construct spur machine and helical gears on a milling and apply the procedures to measure various parameters using different instruments.	
4	Identifies Thread profile of a Threaded component.	
5	Conduct different tests for checking machine alignment.	

Course Name: Audit course – Social Values & Ethics		**Course Code:** 15A99501
1	Ability to develop the capability of shaping themselves into outstanding personalities, through a value based life.	
2	Ability to turn themselves into champions of their lives	
3	Ability to take things positively, convert everything into happiness and contribute for the happiness of others.	
4	Ability to become potential sources for contributing to the development of the society around them and institutions / organizations they work in.	
5	Ability to shape themselves into valuable professionals, follow professional ethics and are able to solve their ethical dilemmas.	

Year& Sem : IV-I **Regulation:** R15

Course Name: Management Science		**Course Code:** 15A52601
1	Understand the crystal structures of materials, defects and correlating the structure with the properties.	
2	Understand the concept of solid solutions and interpret different type of phase diagrams.	
3	Understand different types of Heat treatment techniques.	
4	Acquire knowledge on ferrous non-ferrous alloys.	
5	Understand the importance and application of composite and ceramic materials.	

Course Name: Automobile Engineering		**Course Code:** 15A03701
1	Understand different types of Automobiles.	
2	Understand the different types of systems and mechanisms in an Automobile.	
3	Understand different types of engines based on fuel usage, on the number of strokes and also based on mechanisms.	
4	Understand the faults in maintenance of Automobiles.	
5	Analyse the advantages and disadvantages of various material usages in production of Automobiles.	

Course Name: CAD/CAM		**Course Code:** 15A03702
1	Student will be able to understand the basic fundamentals of computer aided design and manufacturing.	
2	To learn 2D & 3D transformations of the basic entities like line, circle, ellipse Etc.	
3	To understand the different geometric modeling techniques like solid modeling, surface modeling, feature based modeling etc. and to visualize how the Components look like before its manufacturing or fabrication.	
4	To learn the part programming, importance of group technology, computer aided Process planning, computer aided quality control.	
5	To learn the overall configuration and elements of computer integrated Manufacturing systems.	

Course Name: Metrology and Measurements		**Course Code:** 15A03703
1	Explain the basics of standards of measurement,Limits, fits, tolerances in industrial applications,Identify the use of Gauges & Comparators	
2	Classify different types of instruments used in Measurement of linear Angles. Tapers & Flatness	
3	Understand the basic elements of Surface roughness, screw thread, gear measurement Processes necessary skills on Lathe Tool Alignment Test	
4	Describe the significance of measurement system,errors, transducers Specify different types of measurements used for measurement of speed in industrial applications Interrupt the measurement of stress strain,Acceleration & Vibration instruments	
5	Comprehend the fundamentals of thermocouple, Describe the measurement of pressure, sound,power, force, torque in industrial applications	

Course Name: Modern Manufacturing Methods		**Course Code:** 15A03706
1	Realize the need and importance of modern manufacturing methods to maintain quality of machining when compare to traditional methods.	
2	Discuss the Rapid Prototyping, Sterolithograpy methods.	
3	Explain the working principle and operation of USM,AJM,WJM,AWJM,ECM,CM,EDM,WEDM,EDGP,Plasma ,EBM,LBM processes with neat sketch.	
4	Understand advantages and limitations for choosing the appropriate machining technique in industries.	
5	Analyze the process parameters, mechanism of MRR, machining accuracy for above NTM methods.	

Course Name: Automation and Robotics		**Course Code:** 15A03708
1	Understand Automation, types of automation, components of automation, strategies and levels of automation.	
2	Analyze the types of flow lines, quantitative analysis of flow lines, how the assembly is carried out on automated flow line without interruption	
3	Understand the concepts of Robotics, the various components in the anatomy of robot. Types of robot arms, factors for designing grippers.	
4	Analyze kinematics of robot, principles of robot drives and controls. The applications of various types of end effectors, and sensor devices.	
5	Analyze the homogeneous transformations and its applications in the analysis of a robotic structure.	
6	Understand the Robot programming languages which may adopt in different applications of robot.	

Course Name: CAD/ CAM Laboratory		**Course Code:** 15A03710
1	Create 2D and 3D models using modeling software	
2	Understand the CNC control in modern manufacturing system.	
3	Prepare CNC part programming and perform manufacturing.	
4	Create the CL Data and Post process generation using CAM packages.	
5	Apply CAPP in Machining and Turning Centre.	

Course Name: Metrology and Measurements Laboratory		**Course Code:** 15A03711
1	Understand the working of Internal Micrometer, Dial bore indicator and Gear Teeth vernier calipers.	
2	Determine the Angle of given specimen by using Bevel Protractor and Sine Bar.	
3	Analyse the Roughness of the surface by using Tailysurf Instrument.	
4	Determine the pitch of the Screw thread and angle of the thread by Tool Makers Microscope.	
5	Calibrate Pressure Gauges, Capacitive Transducers, LVDT Transducers and Thermocouples.	

HOD **PRINCIPAL**