DEPARTMENT OF MECHANICAL ENGINEERING

2022 REGULATION

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The Mechanical Engineering Program Educational Objectives are to prepare the young graduates to

PEO1	Acquire engineering knowledge to develop solutions for technical problems through investigation and analysis.
PEO2	Gain the ability to use modern tools effectively in support of society and to achieve environmental sustainability.
PEO3	Work independently and collaboratively exhibiting professional and ethical responsibilities.
PEO4	Manage teams, resources and improve continuously in the professional career.

Programme Outcomes(POs)

Engineering Graduates will be able to:

PO1	**Engineering Knowledge:** Apply the knowledge of mathematics, science and mechanical engineering fundamentals.
PO2	**Problem Analysis:** Identify, formulate, and analyze mechanical engineering problems.
PO3	**Design/Development of Solutions:** : Design and develop the system to meet specific needs of society with environmental considerations.

PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods to investigate complex problems.
PO5	**Modern tool usage:** Use appropriate modern tools such as CIM, CFD, CAE, Lean 6-sigma etc., to identify, analyze and solve problems.
PO6	**The engineer and society**: Apply engineering knowledge to assess and solve issues concerning society.
PO7	**Environment and sustainability:** Evaluate the impact of engineering solutions on the environment and ensure its sustainability.
PO8	**Ethics:** Apply professional ethics pertaining to engineering practice
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in multidisciplinary teams.
PO10	**Communication:** Communicate engineering activities effectively to the engineering community and society.
PO11	**Project management and finance**: Demonstrate principles/practices of management and finance in one's own work, as a member and leader in a team, to manage projects in an organization.

PO12	**Life-long learning:** Recognize the need, and prepare for independent and life-long learning process.

Programme Specific Outcomes (PSOs)

PSO1	Demonstrate engineering knowledge in the various core streams of mechanical engineering, namely, thermal engineering, design engineering, manufacturing engineering, material science, and industrial management.
PSO2	Identify the root cause of a problem and solve it by applying modern tools such as CIM, CFD, and CAE using research based approach and innovation.
PSO3	Function competently as an individual or in teams, demonstrating extraordinary communication skills and leadership qualities with social and ethical commitment

LIST OF COURSES
REGULATION 2022

SI.NO	SUB.CODE	SUB.NAME
1	BMATS101	ENGINEERING MATHEMATICS FOR CSE STREAM-I
2	BCHES102	CHEMISTRY FOR CSE
3	BCEDK103	COMPUTER AIDED ENGINEERING DRAWING
4	BESCK104B	INTRODUCTION TO ELECTRICAL ENGINEERING
5	BPLCK105B	INTRODUCTION TO PYTHON PROGRAMMING
6	BENGK106	COMMUNICATIVE ENGLISH
7	BKSKK107/BKBKK107	SAMSKRUTHIKA KANNADA/BALAKE KANNADA
8	BSFHK158	SCIENTIFIC FOUNDATION FOR HEALTH
9	BMATS201	ENGINEERING MATHEMATICS FOR CSE STREAM-II
10	BPHYS202	PHYSICS FOR CSE
11	BPOPS203	PRINCIPLES OF PROGRAMMING USING C
12	BESCK204C	INTRODUCTION TO ELECTRONICS COMMUNICATION
13	BETCK205J	INTRODUCTION TO EMBEDDED SYSTEM
14	BPWSK206	PROFESSIONAL WRITING SKILLS IN ENGLISH
15	BICOK207	INDIAN CONSTITUTION
16	BIDTK258	INNOVATION AND DESIGN THINKING (IDT)
17	BME301	MECHANICS OF MATERIALS
18	BME302	MANUFACTURING PROCESS
19	BME303	MATERIAL SCIENCE AND ENGINEERING

20	BME304	BASIC THERMODYNAMICS
21	BMEL305	INTRODUCTION TO MODELLING AND DESIGN FOR MANUFACTURING
22	BME306B	SMART MATERIALS & SYSTEMS
23	BSCK307	SOCIAL CONNECT AND RESPONSIBILITY
24	BME358A	ADVANCED PYTHON PROGRAMMING LAB
25	BNSK359	NATIONAL SERVICE SCHEME.
26	BPEK359	PHYSICAL EDUCATION
27	BME401	APPLIED THERMODYNAMICS
28	BME402	MACHINING SCIENCE & METROLOGY-INTEGRATED
29	BME403	FLUID MECHANICS-INTEGRATED
30	BME404	MECHANICAL MEASUREMENTS AND METROLOGY LAB
31	BME405A	NON TRADITIONAL MACHINING
32	BME456A	INTRODUCTION TO AI & ML
33	BBOK407	BIOLOGY FOR ENGINEERS
34	BUHK408	UNIVERSAL HUMAN VALUES COURSE
35	BNSK459	NATIONAL SERVICE SCHEME (NSS)
36	BPEK459	PHYSICAL EDUCATION

COURSE OUTCOME FOR MECHANICAL ENGINEERING

DEGREE	**U.G**
PROGRAMME	**B.E - MECHANICAL ENGINEERING**
ACADEMIC YEAR	**2021-22**
REGULATION	**2022**

FIRST SEMESTER	
1.Course Code and Name : BMATS101 ENGINEERING MATHEMATICS FOR CSESTREAM-I	
CO Statements	
At the end of the course, learners will be able	
CO1	**apply the knowledge of calculus to solve problems related to polar curves and learn the notion of partial differentiation to compute rate of change of multivariate**
CO2	**analyze the solution of linear and nonlinear ordinary differential equation**
CO3	**get acquainted and to apply modular arithmetic to computer algorithms**
CO4	**make use of matrix theory for solving the system of linear equations and compute eigenvalues and eigenvectors**
CO5	**familiarize with modern mathematical tools namely MATHEMATICA/MATLAB/ PYTHON/ SCILAB**
2.Course Code and Name : BCHES102 CHEMISTRY FOR CSE	
CO Statements	
At the end of the course, learners will be able	
CO1	**Identify the terms processes involved in scientific and engineering and applications**
CO2	**Explain the phenomena of chemistry to describe the methods of engineering processes**
CO3	**Solve the problems in chemistry that are pertinent in engineering applications**
CO4	**Apply the basic concepts of chemistry to explain the chemical properties and processes**
CO5	**Analyze properties and multidisciplinary situations processes associated with chemical substances in engineering**

3.Course Code and Name: BCEDK103 COMPUTER AIDED ENGINEERING DRAWING	
CO Statements	
At the end of the course, learners will be able	
CO1	**Draw and communicate the objects with definite shape and dimensions**
CO2	**Recognize and Draw the shape and size of objects through different views**
CO3	**Develop the lateral surfaces of the object**
CO4	**Create a Drawing views using CAD software**
CO5	**Identify the interdisciplinary engineering components or systems through its graphical representation.**
4.Course Code and Name: BESCK104B INTRODUCTION TO ELECTRICAL ENGINEERING	
CO Statements	
At the end of the course, learners will be able	
CO1	**Understand the concepts of various energy sources and Electric circuits.**
CO2	**Apply the basic Electrical laws to solve circuits**
CO3	**Discuss the construction and operation of various Electrical Machines.**
CO4	**Identify suitable Electrical machine for practical implementation.**
CO5	**Explain the concepts of electric power transmission and distribution, electricity billing, circuit protective devices and personal safety measures.**
5.Course Code and Name: BPLCK105B INTRODUCTION TO PYTHON PROGRAMMING	
CO Statements	
At the end of the course, learners will be able	
CO1	**Demonstrate proficiency in handling loops and creation of functions**
CO2	**Identify the methods to create and manipulate lists, tuples and dictionaries**
CO3	**Develop programs for string processing and file organization**
CO4	**Interpret the concepts of Object-Oriented Programming as used in Python.**
6.Course Code and Name: BENGK106 COMMUNICATIVE ENGLISH	
CO Statements	
At the end of the course, learners will be able	
CO1	**Understand and apply the Fundamentals of Communication Skills in their communication skills.**
CO2	**Identify the nuances of phonetics, intonation and enhance pronunciation skills.**

CO3	**To impart basic English grammar and essentials of language skills as per present requirement.**
CO4	**Understand and use all types of English vocabulary and language proficiency**
CO5	**Adopt the Techniques of Information Transfer through presentation**
7.Course Code and Name: BKSKK107/BKBKK107 SAMSKRUTHIKA KANNADA/BALAKE KANNADA	
CO Statements	
At the end of the course, learners will be able	
CO1	**To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.**
CO2	**To enable learners to Listen and understand the Kannada language properly.**
CO3	**To speak, read and write Kannada language as per requirement.**
CO4	**To train the learners for correct and polite conservation**
CO5	**To know about Karnataka state and its language, literature and General information about this state.**
8.Course Code and Name: BSFHK158 SCIENTIFIC FOUNDATION FOR HEALTH	
CO Statements	
At the end of the course, learners will be able	
CO1	**To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset.**
CO2	**Develop the healthy lifestyles for good health for their better future.**
CO3	**Build a Healthy and caring relationships to meet the requirements of good/social/positive life**
CO4	**To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.**
CO5	**Prevent and fight against harmful diseases for good health through positive mindset.**
SECOND SEMESTER	
11.Course Code and Name: BMATS201 ENGINEERING MATHEMATICS FOR CSESTREAM-II	
CO Statements	
At the end of the course, learners will be able	
CO1	**Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing area and volume.**
CO2	**Understand the applications of vector calculus refer to solenoidal, and irrotational vectors. Orthogonal curvilinear coordinates**

CO3	**Demonstrate the idea of Linear dependence and independence of sets in the vector space, and linear transformation**
CO4	**Apply the knowledge of numerical methods in analyzing the discrete data and solving**
	the physical and engineering problems.
CO5	**Get familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB /PYTHON/ SCILAB**
12.Course Code and Name: BPHYS202 PHYSICS FOR CSE	
CO Statements	
At the end of the course, learners will be able	
CO1	**Describe the principles of LASERS and Optical fibers and their relevant applications.**
CO2	**Discuss the basic principles of the Quantum Mechanics and its application in Quantum Computing.**
CO3	**Summarize the essential properties of superconductors and its applications in qubits.**
CO4	**Illustrate the application of physics in design and data analysis.**
CO5	**Practice working in groups to conduct experiments in physics and perform precise and honest measurements.**
13.Course Code and Name: BPOPS203 PRINCIPLES OF PROGRAMMING USING C	
CO Statements	
At the end of the course, learners will be able	
CO1	**Elucidate the basic architecture and functionalities of a computer and also recognize the hardware parts.**
CO2	**Apply programming constructs of C language to solve the real world problem**
CO3	**Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting**
CO4	**Explore user-defined data structures like structures, unions and pointers in implementing solutions**
CO5	**Design and Develop Solutions to problems using modular programming constructs using functions**
14.Course Code and Name: BESCK204C INTRODUCTION TO ELECTRONICS COMMUNICATION	
CO Statements	
At the end of the course, learners will be able	

CO1	**Prepare students with fundamental knowledge/ overview in the field of Electronics and Communication Engineering.**
CO2	**Equip students with a basic foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design,embedded systems, and communication systems.**
CO3	**Professionalism & Learning Environment: To inculcate in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication, teamwork, ability to relate engineering issues to a broader social context, and life-long learning needed for a successful professionalcareer.**

15.Course Code and Name: BETCK205J INTRODUCTION TO EMBEDDED SYSTEM	
CO Statements	
At the end of the course, learners will be able	
CO1	**Explain characteristics of Embedded System design**
CO2	**Acquire knowledge about basic concepts of circuit emulators, debugging and RTOS**
CO3	**Analyse embedded system software and hardware requirements**
CO4	**Develop programming skills in embedded systems for various applications.**
CO5	**Design basic embedded system for real time applications**
16.Course Code and Name: BPWSK206 PROFESSIONAL WRITING SKILLS IN ENGLISH	
CO Statements	
At the end of the course, learners will be able	
CO1	**To understand and identify the Common Errors in Writing and Speaking.**
CO2	**To Achieve better Technical writing and Presentation skills.**
CO3	**To read Technical proposals properly and make them to Write good technical reports**
CO4	**Acquire Employment and Workplace communication skills**
CO5	**To learn about Techniques of Information Transfer through presentation in different level**
17.Course Code and Name: BICOK207 INDIAN CONSTITUTION	
CO Statements	
At the end of the course, learners will be able	
CO1	**Analyse the basic structure of Indian Constitution.**
CO2	**Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.**
CO3	**Know about our Union Government, political structure & codes, procedures.**
CO4	**Understand our State Executive & Elections system of India**
CO5	**Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.**
3.Course Code and Name: BIDTK258 INNOVATION AND DESIGN THINKING (IDT)	
CO Statements	
At the end of the course, learners will be able	
CO1	**Appreciate various design process procedure**
CO2	**Generate and develop design ideas through different technique**

CO3	Identify the significance of reverse Engineering to Understand products
CO4	Draw technical drawing for design ideas

THIRD SEMESTER	
1.Course Code and Name : BME301 Mechanics of Materials	
CO Statements	
At the end of the course, learners will be able	
CO1	Understand the concepts of stress and strain in simple and compound bars.
CO2	Explain the importance of principal stresses and principal planes & Analyse cylindrical pressure vessels under various loadings
CO3	Apply the knowledge to understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
CO4	Evaluate stresses induced in different cross-sectional members subjected to shear loads
CO5	Apply basic equation of simple torsion in designing of circular shafts & Columns.
2.Course Code and Name : BME302 Manufacturing Process	
	CO Statements
At the end of the course, learners will be able	
CO1	Describe the casting process and prepare different types of cast products. Acquire knowledge on Pattern, Core, Gating, Riser system and to use Jolt, Squeeze, and Sand Slinger Moulding machines.
CO2	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces. Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mold castings.
CO3	Understand the Solidification process and Casting of Non-Ferrous Metals.
CO4	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes etc. used in manufacturing.
CO5	Describe the methods of different joining processes and thermal effects in joining process.
3.Course Code and Name : BME303 Material Science And Engineering	
At the end of the course, learners will be able	
CO1	Understand the atomic arrangement in crystalline materials and describe the periodic arrangement of atoms in terms of unit cell parameters.
CO2	Understand the importance of phase diagrams and the transformations.
CO3	Explain various heat treatment methods for controlling the microstructure.
CO4	Correlate between material properties with component design and identify various kinds of defects.
CO5	Apply the method of materials selection, material data and knowledge sources for computer aided selection of materials.
4.Course Code and Name : BME304 Basic Thermodynamics	
CO Statements	

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At the end of the course, learners will be able	
CO1	**Explain fundamentals of thermodynamics and evaluate energy interactions across the boundary of thermodynamic systems.**
CO2	**Apply 1st law of thermodynamics to closed and open systems and determine quantity of energy transfers.**
CO3	**Evaluate the feasibility of cyclic and non-cyclic processes using 2nd law of thermodynamics**
CO4	**Apply the knowledge of entropy, reversibility and irreversibility to solve numerical problems and Interpret the behaviour of pure substances and its application in practical problems.**
CO5	**Recognize differences between ideal and real gases and evaluate thermodynamic properties of ideal and real gas mixtures using various relations.**
5. Course Code and Name : BMEL305 Introduction to Modelling and Design for Manufacturing.	
CO Statements	
At the end of the course, learners will be able	
CO1	**Interpret the Machining and surface finish symbols on the component drawings.**
CO2	**Apply limits and tolerances to assemblies and choose appropriate fits for given assemblies.**
CO3	**Illustrate various machine components through drawings**
CO4	**Create assembly drawings as per the conventions.**
6.Course Code and Name : 21UH36 Social Connect & Responsibilities	
CO Statements	
At the end of the course, learners will be able	
CO1	**Understand social responsibility**
CO2	**Practice sustainability and creativity**
CO3	**Showcase planning and organizational skills**
7.Course Code and Name : 21KBK37 Balake Kannada	
CO Statements	
At the end of the course, learners will be able	
CO1	**To understand the necessity of learning of local language for comfortable life.**
CO2	**To Listen and understand the Kannada language properly.**
CO3	**To speak, read and write Kannada language as per requirement.**
CO4	**To communicate (converse) in Kannada language in their daily life with kannada speakers.**
CO5	**To speak in polite conservation.**
8.Course Code and Name : 21ME381 Introduction To Python	

CO Statements	
At the end of the course, learners will be able	
CO1	Demonstrate proficiency in handling of loops and creation of functions.
CO2	Identify the methods to create and manipulate lists, tuples and dictionaries.
CO3	Discover the commonly used operations involving regular expressions and file system.
CO4	Examine working of PDF and word file formats
FOURTH SEMESTER	
1.Course Code and Name : 21ME41 Complex Analysis, Probability and Linear Programming.	
CO Statements	
At the end of the course, learners will be able	
CO1	Use the concepts of an analytic function and complex potentials to solve the problems arising in fluid flow.
CO2	Utilize conformal transformation and complex integral arising in aero foil theory, fluid flow visualization and image processing.
CO3	Apply discrete and continuous probability distributions in analyzing the probability models arising in the engineering field.
CO4	Analyze and solve linear programming models of real-life situations and solve LPP by the simplex method
CO5	Learn techniques to solve Transportation and Assignment problems.
2.Course Code and Name : 21ME42 Machining Science And Jigs & Fixtures	
CO Statements	
At the end of the course, learners will be able	
CO1	Demonstrate the Conventional CNC machines and advanced manufacturing process operations
CO2	Determine tool life, cutting force, and economy of the machining process.
CO3	Analyze the influence of various parameters on machine tools' performance.
CO4	Select the appropriate machine tools and process, the Jigs, and fixtures for various applications.
3.Course Code and Name : 21ME43 Fluid Mechanics	
CO Statements	
At the end of the course, learners will be able	
CO1	Understand the basic principles of fluid mechanics and fluid kinematics
CO2	Acquire the basic knowledge of fluid dynamics and flow measuring instruments
CO3	Understand the nature of flow and flow over bodies and the dimensionless analysis

CO4	**Acquire the compressible flow fundamental and basics of CFD packages and the need for CFD analysis.**
CO5	**Conduct basic experiments of fluid mechanics and understand the experimental uncertainties.**
4.Course Code and Name : 21ME44 Mechanics Of Materials	
CO Statements	
At the end of the course, learners will be able	
CO1	**Understand simple, compound, thermal stresses and strains their relations and strain energy.**
CO2	**Analyse structural members for stresses, strains and deformations.**
CO3	**Analyse the structural members subjected to bending and shear loads.**
CO4	**Analyse shafts subjected to twisting loads.**
CO5	**Analyse the short columns for stability.**
5.Course Code and Name : 21MEL46 Mechanical Measurements And Metrology Laboratory	
CO Statements	
At the end of the course, learners will be able	
CO1	**Understand Calibration of pressure gauge, thermocouple, LVDT, load cell, micrometer.**
CO2	**Apply concepts of Measurement of angle, Demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.**
CO3	**Analyse Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth Vernier/Gear tooth micrometre**
CO4	**Understand the concepts of measurement of surface roughness.**
CO5	**Demonstrate the use of Coordinate Measuring Machine (CMM) / Laser Scanner**
6.Course Code and Name : 21CIP37/47 Constitution of India & Professional Ethics	
CO Statements	
At the end of the course, learners will be able	
CO1	**Analyse the basic structure of Indian Constitution**
CO2	**Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.**
CO3	**know about our Union Government, political structure & codes, procedures.**
CO4	**Understand our State Executive & Elections system of India**
CO5	**Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.**
7.Course Code and Name : 21UH49 Universal Human Values	
CO Statements	
At the end of the course, learners will be able	
CO1	**To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.**
CO2	**To facilitate the development of a Holistic perspective among students towards life and profession living in a natural way.**

CO3	To facilitate the development of a Holistic perspective among students towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based
CO4	To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct.
CO5	To highlight plausible implications of such a Holistic understanding in terms of trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.
8.Course Code and Name : 21ME481 Introduction to AI and ML	
CO Statements	
At the end of the course, learners will be able	
CO1	To familiarize basic principles, and applications of AI
CO2	To guide the students on generalization as a means to capturing patterns in the data
CO3	To make to understand the of challenges in Artificial Intelligence domain.
CO4	Draw technical drawing for design ideas
CO5	To acquaint with the future trends of Artificial Intelligence
FIFTH SEMESTER	
1.Course Code and Name : 21ME51 Theory of Machines	
CO Statements	
At the end of the course, learners will be able	
CO1	Knowledge of mechanisms and their motion and the inversions of mechanisms
CO2	Analyse the velocity, acceleration of links and joints of mechanisms..
CO3	Analyse the mechanisms for static and dynamic equilibrium.
CO4	Carry out the balancing of rotating and reciprocating masses
CO5	Analyse different types of governors used in real life situation, free and forced vibration phenomenon.
2.Course Code and Name : 21ME52 Thermo-fluids Engineering	
CO Statements	
At the end of the course, learners will be able	
CO1	Apply the concepts of testing of I. C. Engines and evaluate their performance, and evaluate the performance of Reciprocating compressor.
CO2	Apply and analyse the concepts related to Refrigeration and Air conditioning, and get conversant with Psychometric Charts, Psychometric processes, human comfort conditions.
CO3	Explain the construction, classification and working principle of the Turbo machines and apply of Euler's turbine equation to evaluate the energy transfer and other related parameters. Compare and evaluate the performance of positive displacement pumps.
CO4	Classify, explain and analyse the various types of hydraulic turbines and centrifugal pumps.
CO5	Classify, explain and analyse various types of steam turbines and centrifugal compressor.

3.Course Code and Name : 21ME53 Finite Element Analysis	
CO Statements	
At the end of the course, learners will be able	
CO1	Identify the application and characteristics of FEA elements such as bars, beams, plane and isoparametric elements.
CO2	Develop element characteristic equation and generation of global equation.
CO3	Formulate and solve Axi-symmetric and heat transfer problems.
CO4	Apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid flow, axi-symmetric and dynamic problems.
4.Course Code and Name : 21ME54 Modern Mobility and Automotive Mechanics	
CO Statements	
At the end of the course, learners will be able	
CO1	Understand the working of different systems employed in automobile
CO2	Analyse the limitation of present day automobiles
CO3	Evaluate the energy sources suitability
CO4	Apply the knowledge for selection of automobiles based on their suitability
5.Course Code and Name : 21MEL55 Design lab	
CO Statements	
At the end of the course, learners will be able	
CO1	Compute the natural frequency of the free and forced vibration of single degree freedom systems, critical speed of shafts.
CO2	Carry out balancing of rotating masses and gyroscope phenomenon & Analyse the governor characteristics.
CO3	Determine stresses in disk, beams and plates using photo elastic bench.
CO4	Determination of Pressure distribution in Journal bearing
CO5	Analyse the stress and strains using strain gauges in compression and bending test & To realize different mechanisms and cam motions.
6.Course Code and Name : 21RMI56 Research Methodology &Intellectual Property Rights	
CO Statements	
At the end of the course, learners will be able	
CO1	To know the meaning of engineering research.
CO2	To know the procedure of Literature Review and Technical Reading.
CO3	To know the fundamentals of patent laws and drafting procedure .
CO4	Understanding the copyright laws and subject matters of copyrights and designs
CO5	Understanding the basic principles of design rights.

7.Course Code and Name : 21CIV57 Environmental Studies	
CO Statements	
At the end of the course, learners will be able	
CO1	**Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,**
CO2	**Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.**
CO3	**Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components.**
CO4	**Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.**
8.Course Code and Name: 21ME581 Basics of MATLAB	
CO Statements	
At the end of the course, learners will be able	
CO1	**Able to implement loops, branching, control instruction and functions in MATLAB programming environment.**
CO2	**Able to program curve fitting, numerical differentiation and integration, solution of linear equations in MATLAB and solve electrical engineering problems.**
CO3	**Able to understand implementation of ODE using ode 45 and execute Solutions of nonlinear equations and DFT in MATLAB.**
CO4	**Able to simulate MATLAB Simulink examples**
SIXTH SEMESTER	
1.Course Code and Name : 21ME61 Production And Operations Management	
CO Statements	
At the end of the course, learners will be able	
CO1	**Apply the necessary tools for decision making in operations management.**
CO2	**Examine various approaches for forecasting the sales demand for an organization.**
CO3	**List various capacity and location plans to determine the suitable capacity required for meeting the forecast demand of an organization.**
CO4	**Analyse the aggregate plan and master production schedule for an organization, given its periodic demand.**
CO5	**Apply MRP, purchasing and SCM techniques into practice.**
2.Course Code and Name : 21ME62 Heat Transfer	
CO Statements	
At the end of the course, learners will be able	
CO1	**Solve steady state heat transfer problems in conduction.**
CO2	**Solve transient heat transfer problems**

CO3	Solve convection heat transfer problems using correlations
CO4	Solve radiation heat transfer problems
CO5	Explain the mechanisms of boiling and condensation. And Determine performance parameters of heat exchangers.

3.Course Code and Name : 21ME63 Machine design	
CO Statements	
At the end of the course, learners will be able	
CO1	Apply codes and standards in the design of machine elements and select an element based on the Manufacturer's catalogue.
CO2	Analyse the performance and failure modes of mechanical components subjected to combined loading and fatigue loading using the concepts of theories of failure.
CO3	Demonstrate the application of engineering design tools to the design of machine components like shafts, springs, couplings, fasteners, welded and riveted joints, brakes and clutches
CO4	Design different types of gears and simple gear boxes for relevant applications.
CO5	Apply design concepts of hydrodynamicbearings for different applications and select Anti friction bearings for different applications using the manufacturers, catalogue.
4.Course Code and Name : 21ME641 Supply Chain Management & Introduction to SAP	
CO Statements	
At the end of the course, learners will be able	
CO1	Understand the framework and scope of supply chain management.
CO2	Build and manage a competitive supply chain using strategies, models, techniques and information technology.
CO3	Plan the demand, inventory and supply and optimize supply chain network.
CO4	Understand the emerging trends and impact of IT on Supply chain.
CO5	Understand the basics of SAP material management system
5.Course Code and Name : 21CV653 Occupational Health & Safety	
CO Statements	
At the end of the course, learners will be able	
CO1	Identify hazards in the workplace that pose a danger or threat to their safety or health ,or that of others.
CO2	Control unsafe or unhealthy hazards and propose methods to eliminate the hazard.
CO3	Present a coherent analysis of a potential safety or health hazard both verbally and in writing, citing the occupational Health and Safety Regulations as well as supported legislation.
CO4	Discuss the role of health and safety in the workplace pertaining to the responsibilities of workers, managers, supervisors
CO5	Identify the decisions required to maintain protection of the environment, workplace as well as personal health and safety.

6.Course Code and Name : 21MEL66 CNC Programming and 3-D Printing Lab	
CO Statements	
At the end of the course, learners will be able	
CO1	Students will have knowledge of G-code and M-code for machining operations.
CO2	Students will able to perform CNC programming for turning, drilling, milling and threading operation.
CO3	Students will able to visualize the 3D models using CAD software's
CO4	Students will able to use 3D printing technology
CO5	Students are able to understand robotic programming and FMS
7.Course Code and Name : 21MEMP67 Mini-project	
CO Statements	
At the end of the course, learners will be able	
CO1	Identify and analyse real world problems.
CO2	Design mechanical Engineering components.
CO3	Learn to work in a team.
8.Course Code and Name : 21INT68 Internship	
CO Statements	
At the end of the course, learners will be able	
CO1	To Analyse the complex engineering activities.
CO2	Apply reasoning contextual knowledge
CO3	To understand by the team work
CO4	Analyse the various communicate Engg. activities
CO5	Demonstrate knowledge and recognize the gained knowledge