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J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
B.TECH. FIRST YEAR
SESSION:2020-21

BRANCH CODE: AII

Course Outcome-2020-21

Course Title : Engineering Mathematics-1 | **Semester : I**
Course Code : MAT001 | **Course Type : Compulsory**
Pre-requisite : Basic knowledge of Mathematics | **L – T – P : 3 – 1– 0**
Stream :Core subject | **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Mathematics
2. To understand the application of Mathematics in engineering and in real life.
3. To investigate the key concepts of Mathematics.
4. To enable students to analyze a problem.

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe rank, Bernoulli's theorem, Taylor's and Maclaurin's theorems for functions of two variables, – Euler's Theorem for functions containing two and three variables, Lagrange's theorem
2. Illustrate the examples of ordinary differential equation, partial differential equation, matrices.
3. Solve questions related to ordinary differential equation, partial differential equation, matrices and their applications.
4. Apply the knowledge of matrices, ordinary differential equation, partial differential equation, and their applications to real world problems.
5. interpret the results of matrices, ordinary differential equation, partial differential equation and their applications.
6. Design a method or modal on matrices, ordinary differential equation, partial differential equation.

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SESSION:2020-21

Course Title : Engineering Physics **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI/1T/2T005 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Physics **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1.To provide a firm grounding in the basic physics principles and concept to resolve many Engineering and technological problems.
2.To understand and study the Physics principles behind the developments of Engineering materials.
3.To provide problem solving experience and learning of concepts through it in engineering physics, in both the classroom and the laboratory learning environment.

COURSE OUTCOMES

At the end of the course students will be able to

1.Acquire fundamental understanding of concepts specifically concern to semiconducting materials, Optics, Fibre optics, Ultrasonics, Dielectric Materials, Electron optics, Quantum Mechanics, Crystal structure and Nano-science, and their engineering applications.
2.Develop the ability to recognize the appropriate physics that applies to experiments based on the Engineering Physics.
3.To develop a systematic, logical approach to problem – solving that can be applied to problems in physics and to problems in general.

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Course Title : Engineering Physics-Lab **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI1L/2L005 **Course Type : Compulsory**

Pre-requisite : Basics of Physics Practical **L – T – P : 0 – 0– 2**

Stream :Core subject **Credits : 1**

COURSE OBJECTIVE

Students will be able to

1. Draw the relevance between the theoretical knowledge and to imply it in a practical manner with respect to analyze various electronic circuits and its components.
2. Demonstrate an ability to make physical measurements and understand the limits of precision in measurements.
3. Enhance the comprehensibility of the practical concepts and their application.
4. Apply the analytical techniques and graphical analysis to the experimental data
5. Develop the skills to identify various parts of the apparatus used in the experiment in laboratory.
6. Design and apply the practical knowledge of engineering physics in daily life

COURSE OUTCOME

Students will be able to

1. Visualize and understand the concepts of various phenomenon of light, principle of LASER, Optical fiber and electric and magnetic field.
2. Understand the working principles of Semiconducting devices and their application.
3. Apply the theoretical concepts to demonstrate the ability to measure properties of a variety of electrical and optical systems
4. Analyze the different crystal structure with the help of crystal models.
5. Construct the various devices based on optical phenomenon.
6. Design the frame work of various electronic circuitries based on semiconducting materials.

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Course Title : Energy and Environment Engineering **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI1T/2T006 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Environment **L – T – P : 3 – 0– 0**

Stream :Theory subject **Credits : 3**

COURSE OBJECTIVES

1. To understand the importance of Energy and Environment
2. To understand the application of energy saving tool in real life.
3. To investigate the key concepts of Energy and Environment.

COURSE OUTCOMES

At the end of the course students will be able to

1) Describe different kind of pollution eg. Water pollution, air pollution, soil pollution etc.

2) Understand the importance of ecosystem for human beings..

3) Discover innovative method of power generation.

4) Correlate the cost of various method of power generation.

5) Judge the quality of air.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Introduction To Computer Programming **Semester : I**

Course Code : HU1T002 **Course Type : Compulsory**

Pr-requisite : Basic knowledge of Computer **L – T – P : 2 – 0– 0**

Stream :Theory subject **Credits : 2**

COURSE OBJECTIVES

1. To understand the importance of Programming
2. To understand the application of C Programming.
3. To investigate the key concepts of C Programming.
4. To enable students build a applications based on C programming

COURSE OUTCOMES

CO1: Define the algorithms, flowcharts, array , pointer, structure ,function , python.

CO2: Discuss and differentiate between variables , operators ,statements , loops, array dimensions.

CO3:Demonstrate working programs using functions, loops ,conditional statements ,array ,pointer, structure and files in C and python language .

CO4:Distinguish between different steps of programming and prioritize levels of programming.

CO5:Find errors and predict outcome in C and python programming.

CO6:Compose and develop any application using C and python programming.

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Course Title : Introduction To Computer Programming (LAB) **Semester : I**

Course Code : HU1L002 **Course Type : Compulsory**

Pr-requisite : Basic knowledge of Computer **L – T – P : 0 – 0– 4**

Stream : Theory subject **Credits : 2**

COURSE OBJECTIVES

1. To introduce students to the basic knowledge of programming fundamentals of C language.
2. To impart writing skill of C programming to the students and solving problems.
3. To impart the concepts like looping, array, functions, pointers, file, structure

COURSE OUTCOME

After completing this lab course you will be able to:

1. Understand the logic for a given problem.
2. Write the algorithm of a given problem.
3. Draw a flow chart of a given problem.
4. Recognize and understand the syntax and construction of C programming code..
5. Make use of different data-structures like arrays, pointers, structures and files.
6. Know the alternative ways of providing solution to a given problem.

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SESSION:2020-21

Course Title : Workshop Practices **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI 1L/2L001 **Course Type : Compulsory**

Pre-requisite : Basic Knowledge Of Workshop **L – T – P :0 – 0– 4**

Stream :Practical subject **Credits : 2**

Instructions to the student:

Each student is required to maintain a „workshop journal" consisting of drawing / sketches of the jobs and a brief description of tools, equipment, and procedure used for doing the job.

Contents:

a**) Carpentry:** Technical Terms related to wood working, Types of wood, Joining materials, Types of joints - Mortise and Tenon, Dovetail, Half Lap, etc., Methods of preparation and applications, Wood working lathe, safety precautions.

b) Welding: Arc welding - welding joints, edge preparation, welding tools and equipment, Gas welding - types of flames, tools and equipment, Resistance welding - Spot welding, joint preparation, tools and equipment, safety precautions.

c) Fitting: Fitting operation like chipping, filing, right angle, marking, drilling, tapping etc., Fitting hand tools like vices, cold chisel, etc. Drilling machine and its operation.

e) Machine shop: Lathe machine, types of lathes, major parts, cutting tool, turning operations (Demo), safety precautions

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SESSION:2020-21

Course Title : Introduction to A I & Its Application **Semester : I**

Course Code : AI1T008 **Course Type:Compulsory**

Pre-requisite : Basic knowledge of Mathematical Logic **L – T – P :2 – 0– 0**

Stream :Theory subject **Credits : Audit**

COURSE OBJECTIVES

1. To understand the importance of AI and use of AI tools
2. To understand the application of AI in engineering and in real life.
3. To investigate the key concepts of knowledge representation and different notations.
4. To enable students to analyze a problem so that appropriate problem solving techniques may be applied.

COURSE OUTCOMES

Upon successful completion of this course student will able :

1. To understand the basics of Artificial Intelligence , Intelligent Agents and its structure
2. To Apply various searching techniques of Problem solving
3. To Acquire theoretical knowledge about principles for logic-based representation and reasoning
4. To Participate in the design of systems that act intelligently and learn from experience
5. To Understand the relation between AI & various domains

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SESSION:2020-21

Course Title : Engineering Mathematics-II **Semester : II**

Course Code : MA2T001 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Mathematics **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Mathematics

2. To understand the application of Mathematics in engineering and in real life.

3. To investigate the key concepts of Mathematics.

4. To enable students to analyze a problem

COURSE OUTCOMES

At the end of the course students will be able to

1.Describe concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus.

2.Illustrate the concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus by using examples.

3.Apply the knowledge of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.

4.Analyze the problems and results of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.

5.Evaluate the problems by using complex numbers, integral calculus & multiple integrals, Fourier series &transform, vector differential calculus, vector integral calculus to solve the engineering problems.

6.Create the methods or model by using complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.

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Course Title : Engineering Chemistry **Semester : I/ II**

Course Code : ME/CE/EE/ET/IT/CS/AI/1T/2T002 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Chemistry **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Chemistry

2. To understand the application of Chemistry in engineering and in real life.

3. To investigate the key concepts of Chemistry knowledge

4. To enable students to analyze a Chemistry problem so that appropriate problem solving techniques

may be applied.

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe various properties of water, nanomateral, transition metal ions and their magnetic properties, Debye-Hückel theory, Quinonoid theory, various electrode, spectrophotometric techniqes .

2. Illustrate the various types of water, carbon nanotubes, Molecular orbital theory, Transport number by Moving Boundary method, Ostwald's theory of acid-base indicator, various batteries, UV and NMR spectroscopy.

3. Analyze the question on water characteristics, electrochemistry and various types of instrumental titration, various unknown sample by UV and NMR spectroscopy .

4. Apply the Knowledge of zeolite process, Ion exchange process, Hot Lime –Soda process, acid base concept, spectroscopic techniques.

5. Develop a Modal on softening of water, standardization of acid and base by various instruments, doping on band structure, spectroscopic techniques.

6. Organize water as per quality, carbon nanotubes, electrodes, Energy level diagrams of diatomic molecules, various elements as per their spectroscopic techniques.

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SESSION:2020-21

Course Title : Engineering Chemistry Practical **Semester : II**

Course Code : ME/CE/EE/ET/IT/CS 1L/2L002 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Chemistry **L – T – P : 0 – 0– 2**

Stream :Theory subject **Credits : 1**

COURSE OBJECTIVES

Students will be able to

1. Students will explore new areas of research in both chemistry and allied fields of science and technology.
2. Students will understand safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.
3. Students will recognize common laboratory techniques including pH measurement, acid/base titrations, UV/Visible spectroscopy.

COURSE OUTCOMES

Students will be able to

1. Recall hardness of water, acid value, saponification number of oils.
2. Demonstrate an ability to make chemical measurements and understand the limits of precision in measurements.
3. Enhance the comprehensibility of the practical concepts and their application.
4. Apply the analytical techniques to the experimental data
5. Making judgments based on criteria and standards through checking and critiquing
6. Design and apply the practical knowledge of engineering chemistry in daily life

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Course Title : Engineering Graphics **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS1T/2T003 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Graphics **L – T – P : 1 – 0– 0**

Stream :Practical subject **Credits : 1**

COURSE OBJECTIVES

1. To understand the concepts like dimensioning, conventions and standards related to engineering graphics in order to become professionally efficient

2. To understand theory of projection and simple machine parts in first and third angle of projection systems.

3. To understand the key concepts CAD software.

4. To enable students to analyze a 2-dimensional & 3-dimensional problem.

COURSE OUTCOMES

1. Define various concepts like dimensioning, conventions and standards related to engineering graphics in order to become professionally efficient.

2. Interpret drawings of simple machine component in first and third angle of projection systems

3. Apply theory of projections in projection of lines, projection of planes and projection of solid.

4. Classify solid geometry in different positions.

5. Assess the two dimensional and three dimensional drawing in CAD software.

6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using CAD software

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SESSION:2020-21

Course Title : Engineering Graphics-Lab **Semester : II**

Course Code : ME/CE/EE/ET/IT/CS/2L003 **Course Type : Compulsory**

Pre-requisite : Basics of Graphics Lab **L – T – P : 0 – 0– 4**

Stream :Practical subject **Credits : 2**

COURSE OBJECTIVES:

The objective of the course is to enable students to

1. Provide basic foundation in CAD software.
2. Understand the fundamentals used to create and manipulate geometric models.
3. Get acquainted with the basic CAD software for to design geometric modeling.

COURSE OUTCOMES:

1. Define basic structure of CAD workstation, CAD commands, Memory types, input/output devices and display devices to become professionally efficient to operate CAD software.
2. Explain drawing of simple machine component in CAD software.
3. Acquire the knowledge of geometric modeling in CAD software.
4. Analyze the steps required in CAD software for 2-dimensional and 3-dimensional models.
5. Assess the two dimensional and three dimensional drawing in CAD software.
6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using CAD software.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Communication Skills **Semester : I/II**

Course Code : HU1T/2T001 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of English **L – T – P : 2 – 0– 0**

Stream :Theory subject **Credits : 2**

Course Objectives:

The main objective of the subject is to enhance the employability skills of engineering studentsas well as communication skills at work place.

The sub-objectives are:

1) To develop students' reading skills and pronunciation.
2) To develop technical communication skills through drafting, letter writing, and précis writing.
3) To develop literary skills through essay writing.
4) To develop public speaking skills of the students.

Course Outcomes:

At the end of the course students will be able to

1) to better reading comprehension, pronunciation, and functional English grammar.
2) to write letters and resumes
3) to organize their thoughts for effective presentation and writing.
4) to learn skills to present themselves well in an interview, and handle a Group Discussion

To expose the students to the ethics of English language by teaching grammar

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Course Title : Communication Skills-Lab **Semester : II**

Course Code : HU2L001 **Course Type : Compulsory**

Pre-requisite : Basics of English grammar **L – T – P : 0 – 0– 4**

Stream :Theory subject **Credits : 2**

COURSE OBJECTIVES:

1. Apply appropriate communication skills. Students are able to enhance their employability skills as well as communication skills at work place.

2. Demonstrate knowledge of communication theory and application. Students have better reading comprehension, pronunciation, and functional English grammar.

3.Practice critical thinking to develop innovative and well-founded perspectives related to the students' emphases.

4.Build and maintain healthy and effective relationships. Students are able to write letters and resumes.

5.Use technology to communicate effectively in various settings and contexts. Students are able to organize their thoughts for effective presentation and writing.

6.Demonstrate appropriate and professional ethical behavior. Students are able to learn skills to present themselves well in an interview, and handle a Group Discussion

COURSE OUTCOMES

Students will be able to

CO1.Remember Communication Skills by giving adequate exposure in reading, writing,

listening and speaking.

CO2. Understand the communication process by identifying, explaining, and applying current communication theories as they relate to a variety of contexts.

CO3. Apply proficiency, both in spoken and written English.

CO4. Analysing the communication behaviours of others and themselves in a variety of scenario (e.g. interpersonal, intercultural, group, public and professional communication, and mass media).

CO5. Evaluate and organize their thoughts for effective presentation and writing.

CO6. Improve research, organizational, and critical thinking skills by finding and evaluating reference material and organizing and presenting effective messages adapted to specific situations.

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SESSION:2020-21

Course Title : Basics of Electrical and Electronics Engineering **Semester : I/II**
Course Code : ME/CE/EE/ET/IT/CS 2T007 **Course Type : Compulsory**
Pre-requisite : Basic knowledge of Electrical and Electronic **L – T – P : 2-0-0**
Stream : Theory Subject **Credits : 0 (Audit)**

COURSE OBJECTIVES

1. To provide a basic information and use of electrical and electronics components.
2. To understand and study the materials used for the preparation of electrical and electronics components.
3. To provide basic knowledge of operation and functionality of electrical and electronics components.

COURSE OUTCOMES:

1. Define fundamentals of electrical system and choose measuring instruments for measurement of electrical quantities & describe the concept PN junction diode and its characteristics.
2. Classify wiring system and compare energy resources for electrical energy generation & elaborate the transistor configuration in CE, CB & CC mode.
3. Plan and organize the utilization of energy resources of electrical system & apply transistor characteristics to construct Amplifier devices.
4. Compare different sources of electrical system & distinguish various logic gates and simplify the Boolean's equations.
5. Justify the utilization of various electrical and electronics components into electrical and electronics circuitries.
6. Construct various circuits using Resistors, capacitors, inductors, PN junction diode, Zener diode, transformers, transistors and logic gates.

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SESSION:2020-21

Course Title	**:**	**Introduction to Drones**	**Semester**	**:**	**II**
Course Code	**:**	**AI2T009**	**Course Type**	**:**	**Compulsory**
Pre-requisite	**:**	**Nil**	**L – T – P**	**:**	**2 – 0– 0**
Stream	**:**	**Theory subject**	**Credits**	**:**	**Audit**

Course Objectives

The main aim of this course is to understand the basics of Drones and its various applications. The course will also impart the knowledge of how to fly a drone by considering the rules and regulations to the specific country. Further the students will be introduced to the safety measures to be taken during flight.

Course Outcomes:

Student will be able to

CO1: To introduce the various types of frame design used for the UAV and to accommodate the electronics over the frame to fly UAV.

CO2: To make the students understand the basic working principal behind the electronic components used and its specification to build a drone from scratch.

CO3: To enable the students to identify and understand various functional modules of the controller using a preprogrammed controller used in the UAV.

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Course Title : Basic Civil and Mechanical Engineering | **Semester : I/II**
Course Code : ME/CE/EE/ET/IT/CS/1T004 | **Course Type : Compulsory**
Pre-requisite : Basic knowledge of Graphics | **L – T – P : 2 – 0– 0**
Stream : Theory subject | **Credits : 0 (Audit)**

COURSE OBJECTIVES :

1. To understand the basic stream of Mechanical Engineering and Civil Engineering.
2. To understand the concepts of product manufacturing, Energy engineering, design engineering, Automobile engineering, construction technique and civil surveying.
3. To have basic knowledge of Casting, Machining, Designing, Manufacturing, different materials for building construction and surveying.

COURSE OUTCOMES:

Students would be able to

1. Define basic stream of Mechanical & Civil Engineering.
2. Explain the concepts of product manufacturing, Energy engineering, design engineering, Automobile engineering, construction technique and civil surveying.
3. Apply Basic knowledge of Casting, Machining, Designing, Manufacturing & Civil Construction technique.
4. Analyzed the different mechanical system and properties of construction & surveying material.
5. Interpret the problem in mechanical system and civil structure.
6. Solve the problem in mechanical system and civil structure.

BoS Chairman

Chairman
BOS (Basic Science & Humanities)
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VISION	MISSION
❖ To shape professional Leaders of Global Standards in Civil Engineering.	❖ To provide quality Education and Excellent Learning Environment for the overall development of students. ❖ Making sustainable efforts for integrating academics with industry.

III Semester

Course Code: CE3T001
Course Name: Civil Engineering - Societal & Global Impact

Course Outcomes:
Student should able to,

CO1. Outline the role of Civil engineering in evolution and revolution of mankind and globally present status of development in India.
CO2. Identify the resources utilization for present and future infrastructural projects using various tools
CO3. Distinguish the necessities of different conventional as well as futuristic infrastructural projects.
CO4. Incorporate the goal of sustainable development to minimize the potential impacts on the global environment.
CO5. Apply various measures for enhancing the building environment, thereby improving quality of life of the occupants.
CO6. Evaluate the potential of Civil Engineering for employment creation and its contribution to the GDP.

Course Code: CE3T002
Course Name: Engineering Mathematics-III

Course Outcomes:
Student should able to,

CO1. Describe Matrices, properties of Laplace transform and Z Transform, partial differential equation, Function of Complex Variables.
CO2. Illustrate the examples using Matrices, Laplace and Z Transform, Partial differential equation, Function of Complex Variables.
CO3. Apply the knowledge of Matrices, Laplace transform, Z Transform, Partial differential equation, Function of Complex Variables to real world problems.
CO4. Analyze the question on Matrices, Laplace transform, Z Transform, Partial differential equation, Function of Complex Variables
CO5. Synthesize the knowledge of Matrices, Laplace transform, Z Transform, Partial differential equation, Function of Complex Variables to solve engineering problem.

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Course Code: CE3T003
Course Name: Building Drawing and Drafting

Course Outcomes:

Student should able to,

CO1. State the basic components of building as per IS 962-1967, Building planning, and drawing parameters as per relevant IS codes.

CO2. Classify the principles of different types building planning and drawing as per relevant IS code and general specifications.

CO3. Interpret the information of component of building, planning with respect to all parameters prescribed by I.S.

CO4. Examine the different types of planning of methods and suggest suitable one as per building byelaws.

CO5. Justify methodology for development of building planning.

CO6. Create the building plan and drafting with all consideration of Indian standards to fulfill client need.

Course Code: CE3T004

Course Name: Mechanics of Rigid Bodies

Course Outcomes:

Student should able to,

CO1. State the basic fundamentals of resultant in coplanar force system, friction, structural analysis, rectilinear motion, Work energy and impulse momentum principle for particle to solve the basic engineering problems.

CO2. Explain the concept of force system, equilibrium, Moment of inertia, Basic theorems to solve civil engineering problems.

CO3. Use concepts and parameters of mechanics to solve real time problem in engineering.

CO4. Examine the force systems and determine the forces in various structural members for safe design.

CO5. Select the suitable methods to design various engineering component as per the analysis

CO6.Design various structural members, also correlate basic knowledge of engineering mechanics in broader way in field of Structural designing.

Course Code: CE3T005

Course Name: Energy Science and Engineering

Course Outcomes:

Student should be able to,

CO1. List and generally explain the main sources of energy and their primary applications nationally and internationally

CO2. Acquire the knowledge of energy sources and scientific concepts/principles behind them.

CO3 Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the impact on the environment.

CO4 List and describe the primary renewable energy resources and technologies.

CO5 Quantify energy demands and makes comparisons among energy uses, resources, and technologies.

CO6 Collect and organize information on renewable energy technologies as a basis for further analysis and evaluation.

Course Code: CE3T006
Course Name: Basic Geology and Geotechnical Engineering

Course Outcomes:
Students should be able to,

CO1. Define geology, Index properties of soil, stress distribution, earth pressure theory, sub soil investigation, and types of foundation as per suitability of soil characteristics.
CO2. Describe the soil behavior under different types of loading for effective foundation design.
CO3. Choose the relevant foundation for various soil properties and strength parameters to reduce the uncertainties in design.
CO4. Analyze the compaction, consolidation and stress distribution parameters.
CO5. Judge the modes of failure of foundation with respect to the stability of slopes for different types of soil.
CO6. Develop the knowledge of foundation engineering for designing various types of foundation.

Course Code: CE3L001
Course Name: Building Drawing and Drafting
Learning Outcomes:
Student should able to,

LO 1: Demonstrate the basic symbols, types of lines and material symbols to develop submission drawing as per building byelaws.
LO 2: Examine the development plan before submission for approval by competent authority.
LO 3: Justify submission drawing of residential building as well as public building as per norms.
LO 4: Assemble all construction details in submission drawing as per the specifications as per relevant IS code.

Course Code: CE3L002
Course Name: Mechanics of Rigid Bodies
Learning Outcomes:
Student should able to,

LO1. Interpret the experimental results of law of machine, forces, support reaction, moment of inertia, friction and law of forces.
LO2. Compare the observation of all experimental data for solving engineering problems.
LO3. Select the suitable data for further analysis and design of various engineering projects.
LO4.Create the model/prototype by using engineering mechanics knowledge based on real time problems.

Course Code: CE3L003
Course Name: Basic Geology and Geotechnical Engineering
Learning Outcomes:

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Student should able to,

LO 1. Illustrate the all geological properties of rocks and minerals, soil index properties, sub soil investigation for foundation design as per need.

LO 2. Experiment soil index properties, sub soil investigation and analyze the results obtained by different soil test as per relevant I.S code.

LO 3. Judge the experimental results of soil index properties, sub soil investigations shear strength parameters and coefficients for field conditions.

LO 4. Design the modern technology for foundation design in the field of geotechnical engineering to cater the scarcity of optimum design solutions.

Course Code: CE3L004
Course Name: Internship
Course Outcomes:
This course contributes primarily to the outcomes:
1. Function in a multi-disciplinary team
2. Engineering problem solving
3. Understand professional and ethical responsibility.
4. Communicate effectively.
5. Understand the impact of engineering solutions to the society.
6. Recognize the need and have the ability for lifelong learning.

Course Code: CE3T007
Course Name: Innovation and Entrepreneurship Development
Course Outcomes:
At the end of the course students will be able to
1. Identify and validate of ideas.
2. Remember Patent registration of Innovation.
3. Understand roles and responsibilities of Entrepreneurship

IV Semester

Course Code: CE4T001
Course Name: Life Science
Course Outcomes:

CO1. Acquire the knowledge of Plant Physiology, Transpiration, Population Dynamics, Environmental Management, biotechnology covering and Biostatistics covering.

CO2. Explain Community ecology, Ecosystem structure, Population ecology, Policies and legal aspects in environmental management and Plant & Animal tissue culture.

CO3. Figure out the terms used in biostatics and the data analysis of biostatics.

CO4. Classify the Ecosystem structure, methods of Plant & Animal tissue culture and measures of Central Tendencies in biostatics.

CO5. Analyze the biostatics data parameters.

CO6. Summarize the life science in respect of Plant Physiology, Population Dynamics, Environmental Management, Biotechnology and Biostatics.

Course Code: CE4T002
Course Name: Hydrology & Water Resource Engineering.

Course Outcomes:
Student should able to,

CO1. Acquire the knowledge to design irrigation projects and understand its importance with respect to necessity and its effect.
CO2. Describe the methods of irrigation and distinguish the stages of reservoir planning.
CO3. Compute the reservoir capacity considering the crop water requirement to construct the dam and distribution system.
CO4. Categorize the type of dam and the design parameter according to the type of dam along with development of irrigation system by provision of diversion head works, canals and canal head works.
CO5. Evaluate the forces acting on dam and stability condition of dam.
CO6. Design the Dam, Spillway, Canal and Canal Head Work

Course Code: CE4T003
Course Name: Concrete Technology and Design of RCC Building Elements

Course Outcomes:
Student should able to,

CO1.Memorize the ingredients of concrete, its physical and chemical properties with the testing on concrete in fresh and hardened state, different philosophies and aspects of reinforced concrete as per the relevant IS Codes.
CO2. Describe the materials and admixtures to be used in concrete and the application of limit state method and working state method.
CO3. Demonstrate the tests on different ingredient of concrete and the results obtained from the testing to appraise its properties in fresh and hardened state
CO4 Apply the knowledge & skills in practical analysis and design of various RCC members like Beams, Columns, stair case, slab, footings etc.
CO5. Assemble the construction materials to produce homogenous mixture and Design a RCC element like beam, slab, column and footings by limit state and working stress method as per IS456-2000 and IS 456-1978 6.
CO6 Recommend appropriate and conventional method as well as code of analysis and design for particular RCC Structure.

Course Code: CE4T004
Course Name: Solid Mechanics
Course Outcomes:
Student should able to,

CO1. Acquire the concepts of stresses, strain, columns and elastic failure theory.
CO2. Identify the critical section to resist deformation for safe design against external loading for suitable design.
CO3. Calculate the stresses in beams, shafts, columns and springs.
CO4. Analyze the thick and thin cylinders, columns using Euler's and Rankin's theory.
CO5. Draw bending moment, shear force and Bending stress diagram under different loading conditions.
CO6. Justify the various types of stresses, moments and forces developed in structural members for designing purpose.

Course Code: CE4T005
Course Name: Surveying and Geomatics
Course Outcomes:
Students should be able to,

CO1. Acquire the knowledge of basic surveying equipment used in basic and advanced surveying techniques.

CO2. Identify the various concepts involved in surveying to observe horizontal, vertical and angular measurements on the field using the latest surveying technology.

CO3. Evaluate Reduced Levels, Horizontal Distances, Vertical Distances, Offset for curve plotting and Parameters of Photogrammetry.

CO4. Analyze the data obtained from Compass Surveying, Leveling, Theodolite Survey, Tacheometry Survey, Plane Table Survey and Photogrammetry Survey.

CO5. Judge suitable method for a various surveying map and data required for further purpose in civil engineering projects.

CO6. Develop various types of Survey maps and suggest suitable methode according to the requirement of client and field conditions.

Course Code: CE4T006
Course Name: Materials, Testing & Evaluation
Course Outcomes:
Students should be able to,

CO1: Acquire the knowledge of engineering materials and testing on it.
CO2: Understand the different characteristics of at material.
CO3: Measure the tension or compression behavior of material.
CO4: Analyze the stresses develop in the material after loading during testing.
CO5: Describe the fracture mechanics.
CO6: Identify modes of failure.

Course Code: CE4L001

Course Name: Concrete Technology & Design of RCC Building Elements Lab
Learning Outcomes:
Students should be able to:

LO1: Demonstrate tests on ingredients of concrete and concrete mix
LO2: Analyze the data obtained from testing's.
LO3: Evaluate the properties of ingredients of concrete and concrete mix and check it's suitability in construction
LO4: Judge the material behavior in fresh and hardened state.

Course Code: CE4L002
Course Name: Solid Mechanics
Learning Outcomes:
Student will able to,

LO1. Perform tension, compression, impact, hardness, torsion test on different specimens and observe the nature of failure.

LO 2. Compare and observe the result obtained with standard IS values and comment on nature of failure and determine the compressive stress

LO 3. Formulate the compressive and shear stresses in specimen and compare the resistance qualities of different materials under different testing's and loading conditions.

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LO 4. Interpret the graph of torque and angle of twist and determine shear strength and modulus of rigidity of the specimen.

Course Code: CE3L003
Course Name: Surveying and Geomatics
Learning Outcomes:
Student should able to,

LO1: Apply the principles of surveying on various surveying methods as per the field conditions.
LO2: Analyze the data collected during the survey to plot the map on the paper.
LO3: Evaluate the horizontal distances, Reduced Levels, Area of irregular figures, and Independent coordinates of traverse.
LO4: Judge the topography of the field from the map.

Course Code: CE4L004
Course Name: Internship
Course Outcomes:
This course contributes primarily to the outcomes:

1. Function in a multi-disciplinary team
2. Engineering problem solving
3. Understand professional and ethical responsibility.
4. Communicate effectively.
5. Understand the impact of engineering solutions to the society.
6. Recognize the need and have the ability for lifelong learning.

Course Code: CE4T007
Course Name: Universal Human Values
Course Outcomes

At the end of the course students will be able to

CO1. To enable students to understand the concept of contemporary ethics at different levels: Individual, local and Global and enable them to cross examine the ethical and social consequences of the decisions of their life-view and world view.
CO2. To develop the ability of students to create a balance between their individual freedom and social responsibilities and enable them to identify the personal, professional and social values and integrate them in their personality after cross examination.
CO3. To enable students to cross examine their earlier decisions taken in life and understand the meaning of ethical dilemma to overcome the ethical dilemmas and engage in critical reflection.
CO4. To develop positive habits of thought and conduct and work cohesively with fellow beings who have variety of strengths, experiences, shortcomings and challenges, hence to enable them to handle diverse type of personalities.
CO5. To enable students to develop a method for making ethically sound decisions for themselves, within hostels, classrooms, university campus and society.

V Semester

BTCVC 501: Design of Steel Structures

Course Outcomes: On completion of the course, the students will be able to:

CO1: Identify and compute the design loads and the stresses developed in the steel member.

CO2: Analyze and design the various connections and identify the potential failure modes.

CO3: Analyze and design various tension, compression and flexural members.

CO4: Understand provisions in relevant BIS Codes.

BTCVC 502: Structural Mechanics-II

Course Outcomes: On completion of the course, the students will be able to:

CO1: Have a basic understanding of matrix method of analysis and will be able to analyze the determinant structure.

CO2: Have a basic understanding of the principles and concepts related to finite difference and finite element methods

CO3: Have a basic understanding of concept of influence line

BTCVC 503: Soil Mechanics

Course Outcomes: On completion of the course, the students will be able to:

CO1: Understand different soil properties and behavior

CO2: Understand stresses in soil and permeability and seepage aspects.

CO3: Develop ability to take up soil design of various foundations.

BTCVC 504: Environmental Engineering

Course Outcomes: On completion of the course, the students will be able to:

CO1: Apply the water treatment concept and methods.

CO2: Prepare basic process designs of water and wastewater treatment plants.

CO3: Apply the wastewater treatment concept and methods.

CO4: Apply the solid waste management concepts.

BTCVC 505: Transportation Engineering

Course Outcomes: On completion of the course, the students will be able to:

CO1: Comprehend various types of transportation systems and their history of the development

CO2: Comprehend to various types of pavements.

CO3: Design the pavements by considering various aspects associated with traffic safety measures.

BTCVL508: Soil Mechanics Laboratory

Course Outcomes: On completion of the course, the students will able to:

CO1: Determine different engineering properties of soil.

CO2: Identify and classify soils based on standard geotechnical engineering practices.

CO3: Perform Laboratory oratory compaction and in-place density tests.

CO4: Perform and interpret direct shear tests and estimate shear strength parameters.

BTCVL509: Environmental Engineering Laboratory

Course Outcomes: On completion of the course, the students will be able to:

CO1: Quantify the pollutant concentration in water, wastewater and ambient air.

CO2: Recommend the degree of treatment required for the water and wastewater.

CO3: Analyze the survival conditions for the microorganism and its growth rate.

BTCVL510: Transportation Engineering Laboratory

Course Outcomes: On completion of the course, the students will be able to:

CO1: Perform tests on various road construction materials.

CO2: Perform CBR tests on local soils to determine subgrade properties needed for roadways.

BTCVF511: Seminar on Topic of Field Visit to works related to Building Services

Student shall visit to ongoing construction sites in field to witness and collect necessary information from works of execution of building services such as electrification, plumbing, air-conditioning, acoustics, etc. It is desirable to collect basic information on components, tools and plants, construction equipment, safety precautions, etc. Intention of the work is to introduce the student to the chronological order of execution of works and generate data on vocabulary of terms in field.

BTCVE506A: Materials, Testing &Evaluation

Course Outcomes: The required course for emphasis in development engineering will help students

CO1: To develop skill among students to construct strong and durable structures by applying knowledge of material science.

CO2: To make the students aware of quality assurance and control in their real life as a professional.

BTCVE506C: Development Engineering

Course Outcomes: The required course for emphasis in development engineering will help students

CO1. To develop multi scaled perspective about decisions in the built environment.

CO2. To expose the students to the analysis and evaluation of real world problems aiming to bring desired change in the society

VI Semester

BTCVC601: Design of Concrete Structures - I

Course Outcomes: On completion of the course, the students will be able to:

CO1: Comprehend to the various design philosophies used for design of reinforced concrete.

CO2: Analyze and design the reinforced concrete slab using limit state and working state method.

CO3: Analyze and design the reinforced concrete beam using limit state and working state method.

CO4: Analyze and design the reinforced concrete column using limit state and working state method.

BTCVC602: Foundation Engineering

Course Outcomes: On completion of the course, the students will be able to:

CO1: To predict soil behavior under the application of loads and come up with appropriate solutions to foundation design queries.

CO2: Analyze the stability of slope by theoretical and graphical methods.

CO3: Analyze the results of in-situ tests and transform measurements and associated uncertainties into relevant design parameters.

CO4: Synthesize the concepts of allowable stress design, appropriate factors of safety, margin of safety, and reliability.

BTCVC603: Concrete Technology

Course Outcomes: On completion of the course, the students will be able to:

CO1: Understand the various types and properties of ingredients of concrete.

CO2: Understand effect of admixtures on the behavior of the fresh and hardened concrete.

CO3: Formulate concrete design mix for various grades of concrete.

BTCVC604: Project Management

Course Outcomes: On completion of the course, the students will be able to:

CO1: Understand various steps in project Management, different types of charts. Construct network by using CPM and PERT method.

CO2: Determine the optimum duration of project with the help of various time estimates.

CO3: Know the concept of engineering economics, economic comparisons, and linear break even analysis problems.

CO4: Understand the concept of total quality Management including Juran and Deming' s philosophy.

BTCVC606: Building Planning and Design

Course Outcomes: On completion of the course, the students will be:

CO1: To plan buildings considering various principles of planning and bye laws of governing body.

CO2: Comprehend various utility requirements in buildings.

CO3: Understand various techniques for good acoustics.

BTCVL608: Building Planning Design and Drawing Laboratory

Course Outcomes: On completion of the course, the students will be able to:

CO1: Draw plan, elevation and section of load bearing and framed structures.

CO2: Draw plan, elevation and section of public structures.

BTCVM 609: Community Project (Mini Project)

Student shall choose a topic of his interest in consultation with faculty in the department. The topic for community project may be related to Civil Engineering area and/or interdisciplinary area. Student shall attempt to collect necessary information and present a summary indicating comprehension of the topic and acquired depth of knowledge. It is desirable to obtain industry or community sponsorship. Simplified tools or devices may be presented in form of working model and a brief report stating development. A power point presentation shall also be submitted.

BTCVS610: Seminar on Topic of Field Visit Road Construction

Student shall visit to ongoing construction sites in field to witness and collect information from works of execution of roads. It is desirable to collect basic information on components of roads, construction machinery, etc. Intention of the work is to introduce the student to the sequential order of execution of road works, preparation of road alignment and various surveys.

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BTCVF611: Industrial Training

Students are expected to undergo industrial training for at least four weeks at factory / construction site / design offices or in combination of these. Training session shall be guided and certified by qualified engineer / architect / contractor in civil engineering. A neat detailed report on activities carried out during training is expected. Students should undergo training in Summer Vacation after Semester VI and appear at examination in Semester VII.

Elective III - BTCVE605A: Waste Water Treatments

Course Outcomes: On completion of the course, the students will be able to:

CO1: Determine the sewage characteristics and design various sewage treatment plants.

CO2: Understand municipal water and wastewater treatment system design and operation.

CO3: Apply environmental treatment technologies and design processes for treatment of industrial waste water.

CO4: Understand the rural sanitation schemes.

BTCVE605D: Advanced Engineering Geology

Course Outcomes: On completion of the course, the students will be able to:

CO1: Understand geological time scale and physiographic division of India and their geological characteristics and different geological formation in India.

CO2: Perform sub surface exploration and interpret core log.

CO3: Solve numerical problem based on core drilling and seismic data.

CO4: Familiar with origin of earthquake, seismic wave and landslide in Deccan trap.

BTCVE 605E: Advanced Soil Mechanics

Course Outcomes: On completion of the course, the students will be able to:

CO1: Behavior of soil based on its particle size and mineral content

CO2: Ability to understand the Earth work equipment

CO3: Ability to understand the necessity of ground improvement and potential of a ground for improvement

CO4: Understand the soil reinforcement mechanisms CO5: Understand the grouting and injection methods.

VII Semester

BTCVC701: Design of Concrete Structures – II

Course Outcomes: On completion of the course, the students will be;

CO1: Able to identify the behavior, analyze and design of the beam sections subjected to torsion.

CO2: Able to analyze and design of axially and eccentrically loaded column and construct the interaction diagram for them.

CO3: Understand various concepts, systems and losses in pre-stressing.

CO4: Able to analyze and design the rectangular and symmetrical I-section pre-stressed beam/girders.

BTCVC702: Infrastructure Engineering

Course Outcomes: On completion of the course, the students will be able to:

CO1: Know about the basics and design of various components of railway engineering

CO2: Understand the types and functions of tracks, junctions and railway stations.

CO3: Know about the aircraft characteristics, planning and components of airport

CO4: Understand the types and components of docks and harbors.

BTCVC703: Water Resources Engineering

Course Outcomes: On completion of the course, the students will be able to:

CO1: Understand need of Irrigation in India and water requirement as per farming practice in India.

CO2: Understand various irrigation structures and schemes.

CO3: Develop basis for design of irrigation schemes.

BTCVC704: Professional Practices

Course Outcomes: On completion of the course, the students will be able to:

CO1: Understand the importance of preparing the types of estimates under different conditions for various structures.

CO2: Know about the rate analysis and bill preparations and to study about the specification writing.

CO3: Know the various types of contract, accounts in PWD, methods for initiating the works in PWD and tendering.

CO4: Understand the valuation of land and buildings, various methods and factors affecting valuation.

BTCVE705A: Construction Techniques

Course Outcomes: On completion of the course, the students will be able to:

1. Understand the planning of new project with site accessibility and services required.

2. Comprehend the various civil construction equipment's.

3. Familiar with layout of RMC plant, production, capacity and operation process.

4. Recognize various aspect of road construction, construction of diaphragm walls, railway track construction etc.

BTCVE705B: Engineering Economics

Course Outcomes: On completion of the course, the students will be able to:

CO1: Adopt as per principles of economics and financing

CO2: Analyze available alternatives and propose best suitable among them

CO3: Apply various models of financial management and accounting

BTCVE705C: Finite Element Method

Course Outcomes: Upon completion of the course the students will be able to:

CO1. Understand the different energy methods in structural analysis and basic concepts of finite element method.

CO2. Analyze 1-D problems related to structural analysis like Bars, Trusses, Beams and Frames using finite element approach.

CO3. Find solution to problems using direct approach methods like Rayleigh – Ritz or Galerkin's Method.

CO4. Solve 2-D problems using knowledge of theory of elasticity.

CO5. Students will be able to implement the knowledge of numerical methods in FEM to find the solution to the various problems in statics and dynamics.

CO6. Analyze 1D, 2D, and 3D structures using different software packages based on FEM.

BTCVE705D: Limit State Design of Steel Structures

Course Outcomes: On completion of the course, the students will be able to:

CO1: Identify and compute the design loads and the stresses developed in the steel member.

CO2: Analyze and design the various connections and identify the potential failure modes.

CO3: Analyze and design various tension, compression and flexural members.

CO4: Understand provisions in relevant BIS Codes.

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BTCVE705E: Plastic Analysis and Design

Course Outcomes: On completion of the course, the students will be able to:

CO1: Understand modes of structural collapse

CO2: Perform the plastic analysis and design of various determinant and in-determinant structures.

CO3: Adapt plastic theory of design for various structures

BTCVE705F: Water Power Engineering

Course Outcomes: On completion of the course, the students will be able to:

CO1: Identify potential energy sources and adapt as per the requirement

CO2: inculcate basics of electricity generation and power plants

CO3: propose suitable energy source for running a project optimistically.

BTCVOE706B: Air Pollution Control

Course Outcomes: On successful completion of this course the students will be able to

CO1: Identify the sources of air pollutants and their effect on human, plants and materials.

CO2: Apply knowledge of meteorology for controlling air pollution

CO3: Design air pollution controlling equipment.

CO4: Apply knowledge of legislation for prevention and control of air pollution.

BTCVOE706C: Bridge Engineering

Course Outcomes: On completion of the course, the students will be able to:

1. Understand components of bridges and its various types.

2. Understand site selection criteria and comprehend various forces acting on bridges.

3. Analyze bridge structures using different analysis techniques.

4. Understand the importance of different types of bridge bearings.

BTCVOE706D: Introduction to Earthquake Engineering

Course Outcomes: On completion of the course, the students will be able to:

CO1 Capture complexities in earthquake resistant design of structures

CO2 Grasp Nature of earthquake vibration and associated forces on structures

CO3 Understand importance of designing the building to targeted seismic performance.

BTCVOE706E: Town and Urban Planning

Outcomes: Upon completion of the course the students will be able to:

CO1. Understand town and Urban planning and their essential attributes

CO2. Identify elements of planning and regulations of the same

CO3. Implement guidelines provided by standard authorities

BTCVOE706F: Tunneling and Underground Excavations

Course Outcomes: On completion of the course, the students will be able to:

CO1: Understand types of tunnels and tunneling methods conforming to site conditions

CO2: Investigate various tunneling operations and relevant machinery required

CO3: Understand methods and operations of excavating large and deep tunnels

CO4: Propose suitable tunneling and excavations methods to optimize the same.

BTCVL707: Design Drawing of RC & Steel Structures

Course Outcomes: On completion of the course, student will be able to simulate a practical design requirement in to a theoretical statement to solve mathematically to arrive at a safe economical and realistic feasible solution that can be executed.

BTCVT709: Field Training /Internship/Industrial

Students are expected to undergo industrial training for at least four weeks at factory / construction site / design offices or in combination of these after VI semester. Training session shall be guided and certified by qualified engineer / architect / contractor in civil engineering. A neat detailed report on activities carried out during training is expected. Students should undergo training in Summer Vacation after Semester VI and appear at examination in Semester VII. A brief report of field training shall be submitted. Evaluation shall be based on report and power point presentation.

BTCVS710: Seminar

Student shall choose a topic of his/her interest in consultation with faculty in the department. The topic for seminar may be related to Recent Developments in Civil Engineering area and/or interdisciplinary area. Student shall attempt to collect necessary information and present a summary indicating comprehension of the topic and acquired depth of knowledge. A brief report on topic of seminar shall be submitted. Evaluation shall be based on report and power point presentation.

BTCVP711: Project Stage I

Term work shall consist of detailed report for chosen topic and output of final working proposed. Report shall summaries the literature survey. Spell out the scope of work, methodology and results. Viva-voce Examination shall be based on work carried out by the student. In case of students opting for Internship in the eighth semester, the Project must be industry-based.

HOD, Civil

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JAIDEV EDUCATION SOCIETY'S
J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
Website: www.jdcoem.ac.in E-mail: info@jdcoem.ac.in
(An Autonomous Institute, with NAAC "A" Grade)
Department of Computer Science & Engineering
"A Place to Learn, A Chance to Grow"
Session: 2020-21

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

BRANCH CODE: All

Course Outcome-2020-21

Course Title : Engineering Mathematics-1
Course Code : MAT001
Pre-requisite : Basic knowledge of Mathematics
Stream :Core subject
Semester : I
Course Type : Compulsory
L – T – P : 3 – 1– 0
Credits : 4

COURSE OBJECTIVES

1. To understand the importance of Mathematics
2. To understand the application of Mathematics in engineering and in real life.
3. To investigate the key concepts of Mathematics.
4. To enable students to analyze a problem.

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe rank, Bernoulli's theorem, Taylor's and Maclaurin's theorems for functions of two variables, – Euler's Theorem for functions containing two and three variables, Lagrange's theorem

2. Illustrate the examples of ordinary differential equation, partial differential equation, matrices.

3. Solve questions related to ordinary differential equation, partial differential equation, matrices and their applications.

4. Apply the knowledge of matrices, ordinary differential equation, partial differential equation, and their applications to real world problems.

5. interpret the results of matrices, ordinary differential equation, partial differential equation and their applications.

6. Design a method or modal on matrices, ordinary differential equation, partial differential equation

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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J D COLLEGE OF ENGINEERING AND MANAGEMENT
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Course Title : Engineering Physics **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI/1T/2T005 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Physics **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1.To provide a firm grounding in the basic physics principles and concept to resolve many Engineering and technological problems.
2.To understand and study the Physics principles behind the developments of Engineering materials.
3.To provide problem solving experience and learning of concepts through it in engineering physics, in both the classroom and the laboratory learning environment.

COURSE OUTCOMES

At the end of the course students will be able to

1.Acquire fundamental understanding of concepts specifically concern to semiconducting materials, Optics, Fibre optics, Ultrasonics, Dielectric Materials, Electron optics, Quantum Mechanics, Crystal structure and Nano-science, and their engineering applications.
2.Develop the ability to recognize the appropriate physics that applies to experiments based on the Engineering Physics.
3.To develop a systematic, logical approach to problem – solving that can be applied to problems in physics and to problems in general.

Prof. Supriya Sawwashere
HOD. CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

Course Title : Engineering Physics-Lab **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI1L/2L005 **Course Type : Compulsory**

Pre-requisite : Basics of Physics Practical **L – T – P : 0 – 0– 2**

Stream :Core subject **Credits : 1**

COURSE OBJECTIVE

Students will be able to

1. Draw the relevance between the theoretical knowledge and to imply it in a practical manner with respect to analyze various electronic circuits and its components.
2. Demonstrate an ability to make physical measurements and understand the limits of precision in measurements.
3. Enhance the comprehensibility of the practical concepts and their application.
4. Apply the analytical techniques and graphical analysis to the experimental data
5. Develop the skills to identify various parts of the apparatus used in the experiment in laboratory.
6. Design and apply the practical knowledge of engineering physics in daily life

COURSE OUTCOME

Students will be able to

1. Visualize and understand the concepts of various phenomenon of light, principle of LASER, Optical fiber and electric and magnetic field.
2. Understand the working principles of Semiconducting devices and their application.
3. Apply the theoretical concepts to demonstrate the ability to measure properties of a variety of electrical and optical systems
4. Analyze the different crystal structure with the help of crystal models.
5. Construct the various devices based on optical phenomenon.
6. Design the frame work of various electronic circuitries based on semiconducting materials

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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Course Title : Energy and Environment Engineering **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI1T/2T006 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Environment **L – T – P : 3 – 0– 0**

Stream :Theory subject **Credits : 3**

COURSE OBJECTIVES

1. To understand the importance of Energy and Environment
2. To understand the application of energy saving tool in real life.
3. To investigate the key concepts of Energy and Environment.

COURSE OUTCOMES

At the end of the course students will be able to

1) Describe different kind of pollution eg. Water pollution, air pollution, soil pollution etc.

2) Understand the importance of ecosystem for human beings..

3) Discover innovative method of power generation.

4) Correlate the cost of various method of power generation.

5) Judge the quality of air.

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

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Course Title : Introduction To Computer Programming **Semester : I**

Course Code : HU1T002 **Course Type : Compulsory**

Pr-requisite : Basic knowledge of Computer **L – T – P : 2 – 0– 0**

Stream :Theory subject **Credits : 2**

COURSE OBJECTIVES

1. To understand the importance of Programming
2. To understand the application of C Programming.
3. To investigate the key concepts of C Programming.
4. To enable students build a applications based on C programming

COURSE OUTCOMES

CO1: Define the algorithms, flowcharts, array , pointer, structure ,function , python.

CO2: Discuss and differentiate between variables , operators ,statements , loops, array dimensions.

CO3:Demonstrate working programs using functions, loops ,conditional statements ,array ,pointer, structure and files in C and python language .

CO4:Distinguish between different steps of programming and prioritize levels of programming.

CO5:Find errors and predict outcome in C and python programming.

CO6:Compose and develop any application using C and python programming.

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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Course Title : Introduction To Computer Programming (LAB) **Semester : I**

Course Code : HU1L002 **Course Type : Compulsory**

Pr-requisite : Basic knowledge of Computer **L – T – P : 0 – 0– 4**

Stream : Theory subject **Credits : 2**

COURSE OBJECTIVES

1. To introduce students to the basic knowledge of programming fundamentals of C language.

2. To impart writing skill of C programming to the students and solving problems.

3. To impart the concepts like looping, array, functions, pointers, file, structure

COURSE OUTCOME

After completing this lab course you will be able to:

1. Understand the logic for a given problem.

2. Write the algorithm of a given problem.

3. Draw a flow chart of a given problem.

4. Recognize and understand the syntax and construction of C programming code..

5. Make use of different data-structures like arrays, pointers, structures and files.

6. Know the alternative ways of providing solution to a given problem.

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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Course Title : Workshop Practices **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI 1L/2L001 **Course Type : Compulsory**

Pre-requisite : Basic Knowledge Of Workshop **L – T – P :0 – 0– 4**

Stream :Practical subject **Credits : 2**

Instructions to the student:

Each student is required to maintain a „workshop journal" consisting of drawing / sketches of the jobs and a brief description of tools, equipment, and procedure used for doing the job.

Contents:

a**) Carpentry:** Technical Terms related to wood working, Types of wood, Joining materials, Types of joints - Mortise and Tenon, Dovetail, Half Lap, etc., Methods of preparation and applications, Wood working lathe, safety precautions.

b) Welding: Arc welding - welding joints, edge preparation, welding tools and equipment, Gas welding - types of flames, tools and equipment, Resistance welding - Spot welding, joint preparation, tools and equipment, safety precautions.

c) Fitting: Fitting operation like chipping, filing, right angle, marking, drilling, tapping etc., Fitting hand tools like vices, cold chisel, etc. Drilling machine and its operation.

e) Machine shop: Lathe machine, types of lathes, major parts, cutting tool, turning operations (Demo), safety precautions

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

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Nagpur-441501

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Course Title : Introduction to A I & Its Application **Semester : I**

Course Code : AI1T008 **Course Type: Compulsory**

Pre-requisite : Basic knowledge of Mathematical Logic **L – T – P :2 – 0– 0**

Stream :Theory subject **Credits : Audit**

COURSE OBJECTIVES

1. To understand the importance of AI and use of AI tools
2. To understand the application of AI in engineering and in real life.
3. To investigate the key concepts of knowledge representation and different notations.
4. To enable students to analyze a problem so that appropriate problem solving techniques may be applied.

COURSE OUTCOMES

Upon successful completion of this course student will able :

1. To understand the basics of Artificial Intelligence , Intelligent Agents and its structure
2. To Apply various searching techniques of Problem solving
3. To Acquire theoretical knowledge about principles for logic-based representation and reasoning
4. To Participate in the design of systems that act intelligently and learn from experience
5. To Understand the relation between AI & various domains

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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J D COLLEGE OF ENGINEERING AND MANAGEMENT
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Course Title : Engineering Mathematics-II **Semester : II**

Course Code : MA2T001 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Mathematics **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Mathematics
2. To understand the application of Mathematics in engineering and in real life.
3. To investigate the key concepts of Mathematics.
4. To enable students to analyze a problem

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus.
2. Illustrate the concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus by using examples.
3. Apply the knowledge of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.
4. Analyze the problems and results of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.
5. Evaluate the problems by using complex numbers, integral calculus & multiple integrals, Fourier series &transform, vector differential calculus, vector integral calculus to solve the engineering problems.

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

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Course Title : Engineering Chemistry **Semester : I/ II**

Course Code : ME/CE/EE/ET/IT/CS/AI/1T/2T002 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Chemistry **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Chemistry
2. To understand the application of Chemistry in engineering and in real life.
3. To investigate the key concepts of Chemistry knowledge
4. To enable students to analyze a Chemistry problem so that appropriate problem solving techniques may be applied.

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe various properties of water, nano-materal, transition metal ions and their magnetic properties, Debye-Hückel theory, Quinonoid theory, various electrode, spectro-photometric techniques.
2. Illustrate the various types of water, carbon nanotubes, Molecular orbital theory, Transport number by Moving Boundary method, Ostwald's theory of acid-base indicator, various batteries, UV and NMR spectroscopy.
3. Analyze the question on water characteristics, electrochemistry and various types of instrumental titration, various unknown sample by UV and NMR spectroscopy .
4. Apply the Knowledge of zeolite process, Ion exchange process, Hot Lime –Soda process, acid base concept, spectroscopic techniques.
5. Develop a Modal on softening of water, standardization of acid and base by various instruments, doping on band structure, spectroscopic techniques.
6. Organize water as per quality, carbon nanotubes, electrodes, Energy level diagrams of diatomic molecules, various elements as per their spectroscopic techniques.

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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Course Title : Engineering Chemistry Practical **Semester : II**

Course Code : ME/CE/EE/ET/IT/CS 1L/2L002 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Chemistry **L – T – P : 0 – 0– 2**

Stream :Theory subject **Credits : 1**

COURSE OBJECTIVES

Students will be able to

1. Students will explore new areas of research in both chemistry and allied fields of science and technology.
2. Students will understand safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.
3. Students will recognize common laboratory techniques including pH measurement, acid/base titrations, UV/Visible spectroscopy.

COURSE OUTCOMES

Students will be able to

1. Recall hardness of water, acid value, saponification number of oils.
2. Demonstrate an ability to make chemical measurements and understand the limits of precision in measurements.
3. Enhance the comprehensibility of the practical concepts and their application.
4. Apply the analytical techniques to the experimental data
5. Making judgments based on criteria and standards through checking and critiquing
6. Design and apply the practical knowledge of engineering chemistry in daily life

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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Course Title : Engineering Graphics **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS1T/2T003 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Graphics **L – T – P : 1 – 0– 0**

Stream :Practical subject **Credits : 1**

COURSE OBJECTIVES

1. To understand the concepts like dimensioning, conventions and standards related to engineering graphics in order to become professionally efficient
2. To understand theory of projection and simple machine parts in first and third angle of projection systems.
3. To understand the key concepts CAD software.
4. To enable students to analyze a 2-dimensional & 3-dimensional problem.

COURSE OUTCOMES

1. Define various concepts like dimensioning, conventions and standards related to engineering graphics
   in order to become professionally efficient.
2. Interpret drawings of simple machine component in first and third angle of projection systems
3. Apply theory of projections in projection of lines, projection of planes and projection of solid.
4. Classify solid geometry in different positions.
5. Assess the two dimensional and three dimensional drawing in CAD software.
6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using
   CAD software

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

J D College of Engineering & Management
Khandala, Katol Road
Nagpur-441501

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J D COLLEGE OF ENGINEERING AND MANAGEMENT
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Course Title : Engineering Graphics-Lab **Semester : II**

Course Code : ME/CE/EE/ET/IT/CS/2L003 **Course Type : Compulsory**

Pre-requisite : Basics of Graphics Lab **L – T – P : 0 – 0– 4**

Stream :Practical subject **Credits : 2**

COURSE OBJECTIVES:

The objective of the course is to enable students to

1. Provide basic foundation in CAD software.
2. Understand the fundamentals used to create and manipulate geometric models.
3. Get acquainted with the basic CAD software for to design geometric modeling.

COURSE OUTCOMES:

1. Define basic structure of CAD workstation, CAD commands, Memory types, input/output devices and display devices to become professionally efficient to operate CAD software.
2. Explain drawing of simple machine component in CAD software.
3. Acquire the knowledge of geometric modeling in CAD software.
4. Analyze the steps required in CAD software for 2-dimensional and 3-dimensional models.
5. Assess the two dimensional and three dimensional drawing in CAD software.
6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using CAD software.

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

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Course Title : Communication Skills **Semester : I/II**

Course Code : HU1T/2T001 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of English **L – T – P : 2 – 0– 0**

Stream :Theory subject **Credits : 2**

Course Objectives:

The main objective of the subject is to enhance the employability skills of engineering studentsas well as communication skills at work place.

The sub-objectives are:

1) To develop students' reading skills and pronunciation.
2) To develop technical communication skills through drafting, letter writing, and précis writing.
3) To develop literary skills through essay writing.
4) To develop public speaking skills of the students.

Course Outcomes:

At the end of the course students will be able to

1) to better reading comprehension, pronunciation, and functional English grammar.
2) to write letters and resumes
3) to organize their thoughts for effective presentation and writing.
4) to learn skills to present themselves well in an interview, and handle a Group Discussion

To expose the students to the ethics of English language by teaching grammar

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

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Course Title : Communication Skills-Lab **Semester : II**

Course Code : HU2L001 **Course Type : Compulsory**

Pre-requisite : Basics of English grammar **L – T – P : 0 – 0– 4**

Stream :Theory subject **Credits : 2**

COURSE OBJECTIVES:

1. Apply appropriate communication skills. Students are able to enhance their employability skills as well as communication skills at work place.
2. Demonstrate knowledge of communication theory and application. Students have better reading comprehension, pronunciation, and functional English grammar.
3. Practice critical thinking to develop innovative and well-founded perspectives related to the students' emphases.
4. Build and maintain healthy and effective relationships. Students are able to write letters and resumes.
5. Use technology to communicate effectively in various settings and contexts. Students are able to organize their thoughts for effective presentation and writing.
6. Demonstrate appropriate and professional ethical behavior. Students are able to learn skills to present themselves well in an interview, and handle a Group Discussion

COURSE OUTCOMES

Students will be able to

CO1. Remember Communication Skills by giving adequate exposure in reading, writing, listening and speaking.
CO2. Understand the communication process by identifying, explaining, and applying current communication theories as they relate to a variety of contexts.
CO3. Apply proficiency, both in spoken and written English.
CO4. Analysing the communication behaviours of others and themselves in a variety of scenario (e.g. interpersonal, intercultural, group, public and professional communication, and mass media).
CO5. Evaluate and organize their thoughts for effective presentation and writing.
CO6. Improve research, organizational, and critical thinking skills by finding and evaluating reference material and organizing and presenting effective messages adapted to specific situations.

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

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Nagpur-441501

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Course Title : Basics of Electrical and Electronics Engineering **Semester : I/II**
Course Code : ME/CE/EE/ET/IT/CS 2T007 **Course Type : Compulsory**
Pre-requisite : Basic knowledge of Electrical and Electronic **L – T – P : 2-0-0**
Stream : Theory Subject **Credits : 0 (Audit)**

COURSE OBJECTIVES

1. To provide a basic information and use of electrical and electronics components.
2. To understand and study the materials used for the preparation of electrical and electronics components.
3. To provide basic knowledge of operation and functionality of electrical and electronics components.

COURSE OUTCOMES:

1. Define fundamentals of electrical system and choose measuring instruments for measurement of electrical quantities & describe the concept PN junction diode and its characteristics.
2. Classify wiring system and compare energy resources for electrical energy generation & elaborate the transistor configuration in CE, CB & CC mode.
3. Plan and organize the utilization of energy resources of electrical system & apply transistor characteristics to construct Amplifier devices.
4. Compare different sources of electrical system & distinguish various logic gates and simplify the Boolean's equations.
5. Justify the utilization of various electrical and electronics components into electrical and electronics circuitries.
6. Construct various circuits using Resistors, capacitors, inductors, PN junction diode, Zener diode, transformers, transistors and logic gates.

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

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Course Title : Introduction to Drones **Semester : II**

Course Code : AI2T009 **Course Type : Compulsory**

Pre-requisite : Nil **L – T – P : 2 – 0– 0**

Stream : Theory subject **Credits : Audit**

Course Objectives

The main aim of this course is to understand the basics of Drones and its various applications. The course will also impart the knowledge of how to fly a drone by considering the rules and regulations to the specific country. Further the students will be introduced to the safety measures to be taken during flight.

Course Outcomes:

Student will be able to

CO1: To introduce the various types of frame design used for the UAV and to accommodate the electronics over the frame to fly UAV.

CO2: To make the students understand the basic working principal behind the electronic components used and its specification to build a drone from scratch.

CO3: To enable the students to identify and understand various functional modules of the controller using a preprogrammed controller used in the UAV.

Prof. Supriya Sawwashere
HOD, CSE
HOD
Computer Science & Engineering
JDCOEM, Nagpur

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Course Title : Basic Civil and Mechanical Engineering **Semester : I/II**
Course Code : ME/CE/EE/ET/IT/CS/1T004
Course Type : Compulsory
Pre-requisite : Basic knowledge of Graphics **L – T – P : 2 – 0– 0**
Stream : Theory subject (Audit) **Credits : 0**

COURSE OBJECTIVES :

1. To understand the basic stream of Mechanical Engineering and Civil Engineering.
2. To understand the concepts of product manufacturing, Energy engineering, design engineering, Automobile engineering, construction technique and civil surveying.
3. To have basic knowledge of Casting, Machining, Designing, Manufacturing, different materials for building construction and surveying.

COURSE OUTCOMES:

Students would be able to

1. Define basic stream of Mechanical & Civil Engineering.
2. Explain the concepts of product manufacturing, Energy engineering, design engineering, Automobile engineering, construction technique and civil surveying.
3. Apply Basic knowledge of Casting, Machining, Designing, Manufacturing & Civil Construction technique.
4. Analyzed the different mechanical system and properties of construction & surveying material.
5. Interpret the problem in mechanical system and civil structure.
6. Solve the problem in mechanical system and civil structure.

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HOD, CSE
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CS3T001	Organizational Behaviour	2 Credit

Course Objectives:

1. To help the students to develop cognizance of the importance of human behavior.
2. To enable students to describe how people behave under different conditions and understand why people behave as they do.
3. To provide the students to analyze specific strategic human resources demands for future action.
4. To enable students to synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behavior and improve results.
5. To learn and appreciate different cultures and diversity in the workplace.

Course outcomes:

1. Students will be able to remember various methods and terms used in different organizational behaviour models.
2. Students will be able to understand Individual as well as Group Behaviour like attitude, perception, motivation, personality, mis-behavior and emotions.
3. Students will be able to apply the Principles of Organization Behaviour through leadership, Power & Politics.
4. Students will be able to analyze the dynamics of organizational behaviour and managing change.
5. 5. Students will be able to evaluate the importance of Advanced Communication tools and Techniques for the decision making Process.
6. Students will be able to design a Policy or Frame Rules and Regulation which will be useful for the employees working under any organization.

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HOD
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CS3T002	Mathematics-III	4 Credits

COURSE OBJECTIVES:

1. To understand the concept of Laplace Transform , Inverse Laplace Transform ,Fourier transform, complex variables Numerical Linear algebra and Stochastic calculus.
2. To understand the application of Mathematics in engineering and in real life.
3. To enable students to apply mathematical tool to solve problems in real life.
4. To enable students to apply mathematical tool to analyze problems in real life

COURSE OUTCOMES:

1. Describe the concept of Laplace Transform, Inverse Laplace Transform, Fourier transform, complex variables, Numerical Linear Algebra and Stochastic calculus.
2. Illustrate the concept of Laplace Transform, Inverse Laplace Transform, Fourier transform, complex variables, Numerical Linear Algebra and Stochastic calculus.
3. Apply the concept of Laplace Transform, Inverse Laplace Transform, Fourier transform, complex variables, Numerical Linear Algebra and Stochastic calculus.
4. Analyze the problem by using the concept of Laplace Transform, Inverse Laplace Transform, Fourier transform, complex variables, Numerical Linear Algebra and Stochastic calculus.
5. Evaluate the problem base on the concept of Laplace Transform, Inverse Laplace Transform, Fourier transform, complex variables, Numerical Linear Algebra and Stochastic calculus.

6. Create the new concept by using the theory of Laplace Transform, Inverse Laplace Transform, Fourier transform, complex variables, Numerical Linear Algebra and Stochastic calculus

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HOD
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CS3T003	Programming for Problem Solving	3 Credit

COURSE OBJECTIVES:

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. To learn the usage of structured programming approach in solving problems

COURSE OUTCOMES:

At the end of this course,

1. 1.Student shall be able to learn and understand to formulate simple algorithms for arithmetic and logical problems
2. 2.Student shall be able to translate the algorithms to programs (in C language).
3. 3.Student shall be able to test and execute the programs and correct syntax and logical errors
4. 4.Student shall be able to implement conditional branching, iteration and recursion
5. 5.Student shall be able to decompose a problem into functions and synthesize a complete program using divide
6. Student shall be able to formulate simple algorithms for arithmetic and logical problems

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CS3T004	Universal Human Value	3 Credit

Course Objective:

1. The objective of the course is fourfold:
2. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
3. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
4. Strengthening of self-reflection.

CS3T006	Data Structure & Algorithms	4 Credit

Course Objectives:

1. To understand the concepts of ADTs.
2. To learn linear data structures – lists, stacks, and queues
3. To understand sorting, searching and hashing algorithms.
4. To apply Tree and Graph structures.

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Student shall be able to Implement abstract data types for linear data structures.
2. Student shall be able to apply the different linear and non-linear data structures to problem solutions
3. Student shall be able to critically analyze the various sorting algorithm.

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CS3T007	Operating System	3 Credit

Course Objective:

At the end of the Course, Student will be able to:

1	To understand the services provided by and the design of an operating system.
2	To understand the structure and organization of the file system.
3	To understand what a process is and how processes are synchronized and scheduled.
4	To understand different approaches to memory management.
5	Students should be able to use system calls for managing processes, memory and the file system.
6	Students should understand the data structures and algorithms used to implement an OS.

Course Outcomes:

1	Identify the significance of operating system in computing devices.
2	Exemplify the communication between application programs and hardware devices through system calls
3	Compare and illustrate various process scheduling algorithms
4	Apply appropriate memory and file management schemes
5	Illustrate various disk scheduling algorithms.
6	Understand the need of access control and protection in an operating system

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CS3T007	Digital Electronics & Computer Organization	3 Credit

Course Objectives:

1. Understanding basic knowledge of Boolean algebra and automaton theory as a core of computer science.
2. Theoretical and practical knowledge about synthesis of combinational and sequential circuits, and programmable structures.

Course Outcomes:

Students will be able to:

1. Define basic logical circuits, Boolean algebra, minimization methods, methods for writing Boolean functions, combinational and sequential circuits, flip-flops, digital automaton, and programmable structures.
2. Describe operation methods of combinational and sequential circuits, similarities and differences of writing the Boolean functions and minimizations.
3. Select appropriate methods for realization and circuit minimization.
4. Pattern recognition for specific circuit realization and error discovery during circuit design process.
5. Synthesis of appropriate combinational and sequential logic circuits.
6. Evaluation of own solutions and error discovery.

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CS3L009	Data structure and Algorithms (Lab)	1 Credit

Course Objectives:

1. To develop skills to design and analyze simple linear and non linear data structures.
2. To identify and apply the suitable algorithm for the given real world problem.
3. To gain knowledge in practical applications of data structures and algorithms

Course Outcomes:

1. To design and analyze the time and space efficiency of the data structure
2. To identity the appropriate data structure for given problem
3. To apply the knowledge of data structures and algorithm to solve the problem

CS3L010	Web Designing Lab	1 Credit

Course Objectives:

1. To learn the basics in web designing using HTML, CSS, and XML.
2. To develop web applications using JSP, servlet, PHP, and Net Beans.

Course Outcomes:

1.To Develop web pages using HTML, CSS, and XML

2.To Deploy real world applications using client side and server-side scripting languages.

3.To Design web applications in Net Beans Environment

4.To Perform the Database Connectivity with MySQL using Java Servlets, JSP, and PHP.

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CS4T001	Java Programming	3 Credit

COURSE OBJECTIVES

1	To learn the Advanced concepts in J2SE
2	To understand Web Application Development, Database Connectivity and itsImplementation using Servlets, JSP and JDBC
3	To introduce advanced Java frameworks for improving the web application design.

COURSE OUTCOMES

1	Student shall be able to Understand and implement advanced Java concepts.
2	Student shall be able to Develop Java based Web applications using Servlets and JSP
3	Student shall be able toIncorporate cutting-edge frameworks in web application development.

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CS4T002 FLAT (Formal Language and Automata Theory) 4 Credit

COURSE OBJECTIVES

1	To Introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.
2	To Enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms

COURSE OUTCOMES

1	Students shall able to Define the mathematical principles behind theoretical computer science.
2	Students shall able to Differentiate and give examples for the different types of automata like finite automata, push down automata, linear bounded automata and turing machine
3	Students shall able to Correlate the different types of automata to real world applications
4	Students shall able toChoose and design appropriate automata for the different requirements outlined by theoretical computer science
5	Students shall able toIdentify the different computational problems and their associated complexity.

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CS4T003	Computer Network	3 Credit

OURSE OBJECTIVES

1	Acquire the computer networking knowledge as well as the existing connectivity technologies and the required infrastructure which comprises the key steps involved in the communication process.
2	Identify the key issues for the realization of the LAN/WAN/MAN network
3	Establish a solid knowledge of the layered approach that makes design, implementation and operation of extensive networks possible. To learn the 7-layer OSI network model (each layer and its responsibilities) and understand the TCP/IP suite of protocols and the networked applications supported by it.
4	Establish a solid knowledge of the layered approach that makes design, implementation, and operation of extensive networks possible.
5	Acquire the knowledge of the basic protocols involved in wired/wireless communication process
6	Acquire the computer networking knowledge as well as the existing connectivity technologies and the required infrastructure which comprises the key steps involved in the communication process.

COURSE OUTCOMES

1	Defining, using and implementing Computer Networks and the basic components of a Network system, explain the importance of data communications, how communication works in data networks.
2	Evaluate data communication link considering elementary concepts of data link layer protocols for error detection and correction.
3	Apply various network layer techniques for designing subnets and supernets and analyse packet flow on basis of routing protocols.

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4	Estimate the congestion control mechanism to improve quality of service of networking application
5	Analyze the features and operations of various application layer protocols such as Http, DNS, Telnet, FTP and SMTP.

CS4T004	Database Management Systems	3 Credit

COURSE OBJECTIVES

1	To Eliminate redundant data.
2	To Make access to the data easy for the user.
3	To Provide for mass storage of relevant data.
4	To Make the latest modifications to the data base available immediately.
5	To Protect data from physical harm and un-authorised systems.
6	To Allow multiple users to be active at one time.

COURSE OUTCOMES

1	Student shall be able to learn and understand fundamentals of database management system
2	Student shall be able to exhibit the query development knowledge
3	Student shall be able to learn modeling and normalization of databases.
4	Student shall be able to learn query processing and optimization techniques.
5	Students shall be able to exhibit to File Organization, Indexing and Hashing
6	Student shall be able to exhibit the knowledge of transaction and concurrency control.

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CS4L006	JAVA(Lab)	1Credit

Course Objective:

1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.
3. Understand the principles of inheritance, packages and interfaces.

Course Outcome:

1. Identify classes, objects, members of a class and relationships among them needed for a specific problem
2. Write Java application programs using OOP principles and proper program structuring
3. Demonstrate the concepts of polymorphism and inheritance.
4. Write Java programs to implement error handling techniques using exception handling

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CS4L008	DBMS (Lab)	1

COURSE OBJECTIVES:

1. To explain basic database concepts, applications, data models, schemas and instances.
2. To demonstrate the use of constraints and relational algebra operations. IV. Describe the basics of SQL and construct queries using SQL.
3. To emphasize the importance of normalization in databases.
4. To facilitate students in Database design
5. To familiarize issues of concurrency control and transaction management.

COURSE OUTCOMES: At the end of the course the students are able to:

1. Apply the basic concepts of Database Systems and Applications.
2. Use the basics of SQL and construct queries using SQL in database creation and interaction.
3. Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.

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CS4L007	Computer Networks (Lab)	1 Credit

Course Objectives:

1. To understand the working principle of various communication protocols.
2. To analyze the various routing algorithms.
3. To know the concept of data transfer between nodes.

Course Outcomes:

Students will be able to:

1. Understand fundamental underlying principles of computer networking.
2. Understand details and functionality of layered network architecture.
3. Apply mathematical foundations to solve computational problems in computer networking.
4. Analyze performance of various communication protocols.
5. Compare routing algorithms.
6. Practice packet /file transmission between nodes.

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CS4T009	Consumer Affairs	Audit

Course Objectives:

1. To familiarise the students with of their rights as a consumer, the social framework of consumer rights and legal framework of protecting consumer rights.
2. To provide an understanding of the procedure of redress of consumer complaints, and the role of different agencies in establishing product and service standards.

Course Outcomes:

The student should be able to

1. Remember the basic terminology related to Consumer Affairs
2. Understand the different approaches applied in different aspects of consumption, customer protection and consumer awareness and their evolution.
3. Apply the knowledge in different aspects of consumption, customer protection and consumer awareness.
4. Comprehend the business firms' interface with consumers and the consumer related regulatory and business environment.
5. Analyse: the norms applicable to different consumption patterns.
6. Evaluating the functioning of Consumer Protection mechanism in India.

Prof. Supriya Sawwashere
HOD, CSE
HOD
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KATOL ROAD, NAGPUR
B.TECH. FIRST YEAR
SESSION:2020-21

BRANCH CODE: AII

Course Outcome-2020-21

Course Title : Engineering Mathematics-1 | **Semester : I**
Course Code : MAT001 | **Course Type : Compulsory**
Pre-requisite : Basic knowledge of Mathematics | **L – T – P : 3 – 1– 0**
Stream :Core subject | **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Mathematics
2. To understand the application of Mathematics in engineering and in real life.
3. To investigate the key concepts of Mathematics.
4. To enable students to analyze a problem.

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe rank, Bernoulli's theorem, Taylor's and Maclaurin's theorems for functions of two variables, – Euler's Theorem for functions containing two and three variables, Lagrange's theorem
2. Illustrate the examples of ordinary differential equation, partial differential equation, matrices.
3. Solve questions related to ordinary differential equation, partial differential equation, matrices and their applications.
4. Apply the knowledge of matrices, ordinary differential equation, partial differential equation, and their applications to real world problems.
5. interpret the results of matrices, ordinary differential equation, partial differential equation and their applications.
6. Design a method or modal on matrices, ordinary differential equation, partial differential equation.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Engineering Physics **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI/1T/2T005 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Physics **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1.To provide a firm grounding in the basic physics principles and concept to resolve many Engineering and technological problems.
2.To understand and study the Physics principles behind the developments of Engineering materials.
3.To provide problem solving experience and learning of concepts through it in engineering physics, in both the classroom and the laboratory learning environment.

COURSE OUTCOMES

At the end of the course students will be able to

1.Acquire fundamental understanding of concepts specifically concern to semiconducting materials, Optics, Fibre optics, Ultrasonics, Dielectric Materials, Electron optics, Quantum Mechanics, Crystal structure and Nano-science, and their engineering applications.
2.Develop the ability to recognize the appropriate physics that applies to experiments based on the Engineering Physics.
3.To develop a systematic, logical approach to problem – solving that can be applied to problems in physics and to problems in general.

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SESSION:2020-21

Course Title : Engineering Physics-Lab **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI1L/2L005 **Course Type : Compulsory**

Pre-requisite : Basics of Physics Practical **L – T – P : 0 – 0– 2**

Stream :Core subject **Credits : 1**

COURSE OBJECTIVE

Students will be able to

1. Draw the relevance between the theoretical knowledge and to imply it in a practical manner with respect to analyze various electronic circuits and its components.
2. Demonstrate an ability to make physical measurements and understand the limits of precision in measurements.
3. Enhance the comprehensibility of the practical concepts and their application.
4. Apply the analytical techniques and graphical analysis to the experimental data
5. Develop the skills to identify various parts of the apparatus used in the experiment in laboratory.
6. Design and apply the practical knowledge of engineering physics in daily life

COURSE OUTCOME

Students will be able to

1. Visualize and understand the concepts of various phenomenon of light, principle of LASER, Optical fiber and electric and magnetic field.
2. Understand the working principles of Semiconducting devices and their application.
3. Apply the theoretical concepts to demonstrate the ability to measure properties of a variety of electrical and optical systems
4. Analyze the different crystal structure with the help of crystal models.
5. Construct the various devices based on optical phenomenon.
6. Design the frame work of various electronic circuitries based on semiconducting materials.

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SESSION:2020-21

Course Title : Energy and Environment Engineering **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI1T/2T006 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Environment **L – T – P : 3 – 0– 0**

Stream :Theory subject **Credits : 3**

COURSE OBJECTIVES

1. To understand the importance of Energy and Environment
2. To understand the application of energy saving tool in real life.
3. To investigate the key concepts of Energy and Environment.

COURSE OUTCOMES

At the end of the course students will be able to

1) Describe different kind of pollution eg. Water pollution, air pollution, soil pollution etc.

2) Understand the importance of ecosystem for human beings..

3) Discover innovative method of power generation.

4) Correlate the cost of various method of power generation.

5) Judge the quality of air.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Introduction To Computer Programming **Semester : I**

Course Code : HU1T002 **Course Type : Compulsory**

Pr-requisite : Basic knowledge of Computer **L – T – P : 2 – 0– 0**

Stream :Theory subject **Credits : 2**

COURSE OBJECTIVES

1. To understand the importance of Programming
2. To understand the application of C Programming.
3. To investigate the key concepts of C Programming.
4. To enable students build a applications based on C programming

COURSE OUTCOMES

CO1: Define the algorithms, flowcharts, array , pointer, structure ,function , python.

CO2: Discuss and differentiate between variables , operators ,statements , loops, array dimensions.

CO3:Demonstrate working programs using functions, loops ,conditional statements ,array ,pointer, structure and files in C and python language .

CO4:Distinguish between different steps of programming and prioritize levels of programming.

CO5:Find errors and predict outcome in C and python programming.

CO6:Compose and develop any application using C and python programming.

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SESSION:2020-21

Course Title : Introduction To Computer Programming (LAB) **Semester : I**

Course Code : HU1L002 **Course Type : Compulsory**

Pr-requisite : Basic knowledge of Computer **L – T – P : 0 – 0– 4**

Stream : Theory subject **Credits : 2**

COURSE OBJECTIVES

1. To introduce students to the basic knowledge of programming fundamentals of C language.
2. To impart writing skill of C programming to the students and solving problems.
3. To impart the concepts like looping, array, functions, pointers, file, structure

COURSE OUTCOME

After completing this lab course you will be able to:

1. Understand the logic for a given problem.
2. Write the algorithm of a given problem.
3. Draw a flow chart of a given problem.
4. Recognize and understand the syntax and construction of C programming code..
5. Make use of different data-structures like arrays, pointers, structures and files.
6. Know the alternative ways of providing solution to a given problem.

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B.TECH. FIRST YEAR

SESSION:2020-21

Course Title : Workshop Practices **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI 1L/2L001 **Course Type : Compulsory**

Pre-requisite : Basic Knowledge Of Workshop **L – T – P :0 – 0– 4**

Stream :Practical subject **Credits : 2**

Instructions to the student:

Each student is required to maintain a „workshop journal" consisting of drawing / sketches of the jobs and a brief description of tools, equipment, and procedure used for doing the job.

Contents:

a**) Carpentry:** Technical Terms related to wood working, Types of wood, Joining materials, Types of joints - Mortise and Tenon, Dovetail, Half Lap, etc., Methods of preparation and applications, Wood working lathe, safety precautions.

b) Welding: Arc welding - welding joints, edge preparation, welding tools and equipment, Gas welding - types of flames, tools and equipment, Resistance welding - Spot welding, joint preparation, tools and equipment, safety precautions.

c) Fitting: Fitting operation like chipping, filing, right angle, marking, drilling, tapping etc., Fitting hand tools like vices, cold chisel, etc. Drilling machine and its operation.

e) Machine shop: Lathe machine, types of lathes, major parts, cutting tool, turning operations (Demo), safety precautions

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KATOL ROAD, NAGPUR
B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Introduction to A I & Its Application **Semester : I**

Course Code : AI1T008 **Course Type:Compulsory**

Pre-requisite : Basic knowledge of Mathematical Logic **L – T – P :2 – 0– 0**

Stream :Theory subject **Credits : Audit**

COURSE OBJECTIVES

1. To understand the importance of AI and use of AI tools
2. To understand the application of AI in engineering and in real life.
3. To investigate the key concepts of knowledge representation and different notations.
4. To enable students to analyze a problem so that appropriate problem solving techniques may be applied.

COURSE OUTCOMES

Upon successful completion of this course student will able :

1. To understand the basics of Artificial Intelligence , Intelligent Agents and its structure
2. To Apply various searching techniques of Problem solving
3. To Acquire theoretical knowledge about principles for logic-based representation and reasoning
4. To Participate in the design of systems that act intelligently and learn from experience
5. To Understand the relation between AI & various domains

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SESSION:2020-21

Course Title : Engineering Mathematics-II **Semester : II**

Course Code : MA2T001 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Mathematics **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Mathematics

2. To understand the application of Mathematics in engineering and in real life.

3. To investigate the key concepts of Mathematics.

4. To enable students to analyze a problem

COURSE OUTCOMES

At the end of the course students will be able to

1.Describe concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus.

2.Illustrate the concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus by using examples.

3.Apply the knowledge of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.

4.Analyze the problems and results of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.

5.Evaluate the problems by using complex numbers, integral calculus & multiple integrals, Fourier series &transform, vector differential calculus, vector integral calculus to solve the engineering problems.

6.Create the methods or model by using complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.

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SESSION:2020-21

Course Title : Engineering Chemistry **Semester : I/ II**

Course Code : ME/CE/EE/ET/IT/CS/AI/1T/2T002 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Chemistry **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Chemistry

2. To understand the application of Chemistry in engineering and in real life.

3. To investigate the key concepts of Chemistry knowledge

4. To enable students to analyze a Chemistry problem so that appropriate problem solving techniques

may be applied.

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe various properties of water, nanomateral, transition metal ions and their magnetic properties, Debye-Hückel theory, Quinonoid theory, various electrode, spectrophotometric techniqes .

2. Illustrate the various types of water, carbon nanotubes, Molecular orbital theory, Transport number by Moving Boundary method, Ostwald's theory of acid-base indicator, various batteries, UV and NMR spectroscopy.

3. Analyze the question on water characteristics, electrochemistry and various types of instrumental titration, various unknown sample by UV and NMR spectroscopy .

4. Apply the Knowledge of zeolite process, Ion exchange process, Hot Lime –Soda process, acid base concept, spectroscopic techniques.

5. Develop a Modal on softening of water, standardization of acid and base by various instruments, doping on band structure, spectroscopic techniques.

6. Organize water as per quality, carbon nanotubes, electrodes, Energy level diagrams of diatomic molecules, various elements as per their spectroscopic techniques.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Engineering Chemistry Practical **Semester : II**

Course Code : ME/CE/EE/ET/IT/CS 1L/2L002 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Chemistry **L – T – P : 0 – 0– 2**

Stream :Theory subject **Credits : 1**

COURSE OBJECTIVES

Students will be able to

1. Students will explore new areas of research in both chemistry and allied fields of science and technology.
2. Students will understand safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.
3. Students will recognize common laboratory techniques including pH measurement, acid/base titrations, UV/Visible spectroscopy.

COURSE OUTCOMES

Students will be able to

1. Recall hardness of water, acid value, saponification number of oils.
2. Demonstrate an ability to make chemical measurements and understand the limits of precision in measurements.
3. Enhance the comprehensibility of the practical concepts and their application.
4. Apply the analytical techniques to the experimental data
5. Making judgments based on criteria and standards through checking and critiquing
6. Design and apply the practical knowledge of engineering chemistry in daily life

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Engineering Graphics **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS1T/2T003 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Graphics **L – T – P : 1 – 0– 0**

Stream :Practical subject **Credits : 1**

COURSE OBJECTIVES

1. To understand the concepts like dimensioning, conventions and standards related to engineering graphics in order to become professionally efficient

2. To understand theory of projection and simple machine parts in first and third angle of projection systems.

3. To understand the key concepts CAD software.

4. To enable students to analyze a 2-dimensional & 3-dimensional problem.

COURSE OUTCOMES

1. Define various concepts like dimensioning, conventions and standards related to engineering graphics in order to become professionally efficient.

2. Interpret drawings of simple machine component in first and third angle of projection systems

3. Apply theory of projections in projection of lines, projection of planes and projection of solid.

4. Classify solid geometry in different positions.

5. Assess the two dimensional and three dimensional drawing in CAD software.

6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using CAD software

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Engineering Graphics-Lab **Semester : II**

Course Code : ME/CE/EE/ET/IT/CS/2L003 **Course Type : Compulsory**

Pre-requisite : Basics of Graphics Lab **L – T – P : 0 – 0– 4**

Stream :Practical subject **Credits : 2**

COURSE OBJECTIVES:

The objective of the course is to enable students to

1. Provide basic foundation in CAD software.
2. Understand the fundamentals used to create and manipulate geometric models.
3. Get acquainted with the basic CAD software for to design geometric modeling.

COURSE OUTCOMES:

1. Define basic structure of CAD workstation, CAD commands, Memory types, input/output devices and display devices to become professionally efficient to operate CAD software.
2. Explain drawing of simple machine component in CAD software.
3. Acquire the knowledge of geometric modeling in CAD software.
4. Analyze the steps required in CAD software for 2-dimensional and 3-dimensional models.
5. Assess the two dimensional and three dimensional drawing in CAD software.
6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using CAD software.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Communication Skills **Semester : I/II**

Course Code : HU1T/2T001 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of English **L – T – P : 2 – 0– 0**

Stream :Theory subject **Credits : 2**

Course Objectives:

The main objective of the subject is to enhance the employability skills of engineering studentsas well as communication skills at work place.

The sub-objectives are:

1) To develop students' reading skills and pronunciation.
2) To develop technical communication skills through drafting, letter writing, and précis writing.
3) To develop literary skills through essay writing.
4) To develop public speaking skills of the students.

Course Outcomes:

At the end of the course students will be able to

1) to better reading comprehension, pronunciation, and functional English grammar.
2) to write letters and resumes
3) to organize their thoughts for effective presentation and writing.
4) to learn skills to present themselves well in an interview, and handle a Group Discussion

To expose the students to the ethics of English language by teaching grammar

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Communication Skills-Lab **Semester : II**

Course Code : HU2L001 **Course Type : Compulsory**

Pre-requisite : Basics of English grammar **L – T – P : 0 – 0– 4**

Stream :Theory subject **Credits : 2**

COURSE OBJECTIVES:

1. Apply appropriate communication skills. Students are able to enhance their employability skills as well as communication skills at work place.

2. Demonstrate knowledge of communication theory and application. Students have better reading comprehension, pronunciation, and functional English grammar.

3.Practice critical thinking to develop innovative and well-founded perspectives related to the students' emphases.

4.Build and maintain healthy and effective relationships. Students are able to write letters and resumes.

5.Use technology to communicate effectively in various settings and contexts. Students are able to organize their thoughts for effective presentation and writing.

6.Demonstrate appropriate and professional ethical behavior. Students are able to learn skills to present themselves well in an interview, and handle a Group Discussion

COURSE OUTCOMES

Students will be able to

CO1.Remember Communication Skills by giving adequate exposure in reading, writing,

listening and speaking.

CO2. Understand the communication process by identifying, explaining, and applying current communication theories as they relate to a variety of contexts.

CO3. Apply proficiency, both in spoken and written English.

CO4. Analysing the communication behaviours of others and themselves in a variety of scenario (e.g. interpersonal, intercultural, group, public and professional communication, and mass media).

CO5. Evaluate and organize their thoughts for effective presentation and writing.

CO6. Improve research, organizational, and critical thinking skills by finding and evaluating reference material and organizing and presenting effective messages adapted to specific situations.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Basics of Electrical and Electronics Engineering **Semester : I/II**
Course Code : ME/CE/EE/ET/IT/CS 2T007 **Course Type : Compulsory**
Pre-requisite : Basic knowledge of Electrical and Electronic **L – T – P : 2-0-0**
Stream : Theory Subject **Credits : 0 (Audit)**

COURSE OBJECTIVES

1. To provide a basic information and use of electrical and electronics components.
2. To understand and study the materials used for the preparation of electrical and electronics components.
3. To provide basic knowledge of operation and functionality of electrical and electronics components.

COURSE OUTCOMES:

1. Define fundamentals of electrical system and choose measuring instruments for measurement of electrical quantities & describe the concept PN junction diode and its characteristics.
2. Classify wiring system and compare energy resources for electrical energy generation & elaborate the transistor configuration in CE, CB & CC mode.
3. Plan and organize the utilization of energy resources of electrical system & apply transistor characteristics to construct Amplifier devices.
4. Compare different sources of electrical system & distinguish various logic gates and simplify the Boolean's equations.
5. Justify the utilization of various electrical and electronics components into electrical and electronics circuitries.
6. Construct various circuits using Resistors, capacitors, inductors, PN junction diode, Zener diode, transformers, transistors and logic gates.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title :	**Introduction to Drones**	**Semester :**	**II**
Course Code :	**AI2T009**	**Course Type :**	**Compulsory**
Pre-requisite :	**Nil**	**L – T – P :**	**2 – 0– 0**
Stream :	**Theory subject**	**Credits :**	**Audit**

Course Objectives

The main aim of this course is to understand the basics of Drones and its various applications. The course will also impart the knowledge of how to fly a drone by considering the rules and regulations to the specific country. Further the students will be introduced to the safety measures to be taken during flight.

Course Outcomes:

Student will be able to

CO1: To introduce the various types of frame design used for the UAV and to accommodate the electronics over the frame to fly UAV.

CO2: To make the students understand the basic working principal behind the electronic components used and its specification to build a drone from scratch.

CO3: To enable the students to identify and understand various functional modules of the controller using a preprogrammed controller used in the UAV.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title	**: Basic Civil and Mechanical Engineering**	**Semester**	**: I/II**
Course Code	**: ME/CE/EE/ET/IT/CS/1T004**		**Course**
Type	**: Compulsory**		
Pre-requisite	**: Basic knowledge of Graphics**	**L – T – P**	**: 2 – 0– 0**
Stream	**: Theory subject**	**Credits**	**: 0 (Audit)**

COURSE OBJECTIVES :

1. To understand the basic stream of Mechanical Engineering and Civil Engineering.
2. To understand the concepts of product manufacturing, Energy engineering, design engineering, Automobile engineering, construction technique and civil surveying.
3. To have basic knowledge of Casting, Machining, Designing, Manufacturing, different materials for building construction and surveying.

COURSE OUTCOMES:

Students would be able to

1. Define basic stream of Mechanical & Civil Engineering.
2. Explain the concepts of product manufacturing, Energy engineering, design engineering, Automobile engineering, construction technique and civil surveying.
3. Apply Basic knowledge of Casting, Machining, Designing, Manufacturing & Civil Construction technique.
4. Analyzed the different mechanical system and properties of construction & surveying material.
5. Interpret the problem in mechanical system and civil structure.
6. Solve the problem in mechanical system and civil structure.

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Website: www.jdcoem.ac.in E-mail: info@jdcoem.ac.in

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DEPARTMENT OF ELECTRICAL ENGINEERING

Session : 2020-21

3rd Semester

Name of Subject - Engineering Economics
Subject Code - EE3T001

Course outcome nun	CO statement
CO1	Remember and define basics of the Economics
CO2	Understand Mechanism of Price Fixation
CO3	Identify Time value of Money.
CO4	Analyze and classify basic Factors of Production
CO5	Interpret Indian Economy and Globalization.
CO6	Plan To become Self Employed

Name of Subject - Engineering Mathematics –III
Subject Code - EE3T002

CO1	Remember properties of Laplace transform , Convolution Theorem, Fourier integral theorem , Parseval‟s identity , Cauchy‘s integral theorem , Cauchy‘s residue theorem
CO2	Describe properties of Laplace transform , Convolution Theorem, Fourier integral theorem , Parseval‟s identity , Cauchy‘s integral theorem , Cauchy‘s residue theorem .
CO3	Illustrate the examples using Laplace transform, Fourier Transform, Partial differential equation, Function of Complex Variables, Matrices.
CO4	Apply the knowledge of Laplace transform ,Z-transform, function of complex variable, Advance partial differential equation.
CO5	Analyze the question on Laplace transform, Fourier Transform, Partial differential equation , Function of Complex Variables
CO6	Create a modal using Laplace transform, Fourier Transform, Partial differential equation, Function of Complex Variables, Matrices.

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Name of Subject -Fundamentals of Electrical Engineering
Subject Code - EE3T003

CO1	Remember the basic laws of electric and magnetic circuits also Define various A.C. and D.C Quantities
CO2	Understand and interpret the sinusoidal electrical quantities mathematically as well as graphically in the form of waveforms/phasors and illustrate the 1-phase/3-phase AC circuits.
CO3	Apply knowledge to calculate the power loss, voltage drop of electric and magnetic circuit also identify illumination required and the knowledge related with its need.
CO4	Analyze various electric, magnetic circuit and distinguish between properties
CO5	Evaluate lighting system, recommend various lighting as per requirement also able to Explain A.C. fundamentals.
CO6	Design lighting system and also able to give solutions on single phase, poly phase and magnetic circuit unknown quantities.

Name of Subject -Network Analysis
Subject Code - EE3T004

CO1	Define basic concepts and principles related to Circuit Analysis
CO2	Identify the super mesh & super nodal problems.
CO3	Apply a variety of circuit analysis methods including theorems and Laplace transform
CO4	Solve two port network problems.
CO5	To design and develop network equations and their solutions.
CO6	Select best possible method of circuit analysis for a given situation

Name of Subject -Electrical Machine I
Subject Code - EE3T005

CO1	Recall the basic laws and rules of electromagnetic induction, electric and magnetic circuits.
CO2	Understand constructional features, working principles of electrical machines and explain different types of starting & speed control methods of electric motors.

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CO3	Apply knowledge to calculate the power loss, voltage regulation, efficiency of transformer and operating speed of electric motor and choose type of motor, its starting and speed control methods with respect to applications.
CO4	Analyse performance indices, vector diagrams of electrical machines and examine the need of parallel operation, O.C. & S.C. test, Polarity test on transformer, and blocked rotor test on induction motors.
CO5	Evaluate braking methods of DC, and induction motor.
CO6	Design motoring system able to give solutions for single phase, three phase and DC supply with respect to supply available and load requirements

Name of Subject -Measurement and Instrumentation
Subject Code - EE3T006

CO1	Remember the different types of instruments used in electrical measurements.
CO2	Understand the operating principles of various electrical measuring instruments.
CO3	Apply knowledge of variety of instruments available for required parameter and identify the appropriate one.
CO4	Analyze and classify different electrical measuring instruments on basis of type of electrical/ physical quantity to be measured.
CO5	Evaluate different electrical measuring instruments
CO6	Test and solve various problems on electrical measuring instruments

Name of Subject - Universal Human Values -II
Subject Code - EE3T007

CO1	Students are expected to become more aware of their surroundings, society, social problems and their sustainable solutions, while keeping human relationships and human nature in mind.
CO2	They would have better critical ability.
CO3	They would also become sensitive to their commitment towards what they believe in (humane values. Humane relationships and humane society).
CO4	they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

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Name of Subject - Network Analysis Lab
Subject Code - EE3L004

CO1	Define basic concepts and principles related to Circuit Analysis
CO2	Identify the super mesh & super nodal problems
CO3	Verifies principles of network
CO4	Solve two port network problems
CO5	To Analyze RLC Circuit

Name of Subject - Electrical Machine I Lab
Subject Code - EE3L005

CO1	The basic principle of transfer of electrical power, operation, construction of Single phase and Three phase transformers, their classification, connections and phasor diagrams.
CO2	The basic principle, construction, operation, Performance characteristics, steady state analysis and applications of DC generators and motors.
CO3	The basic principle, construction, operation, Performance characteristics, steady state analysis, Speed control and applications of Single Phase and Three phase Induction motors.

Name of Subject - Measurement and Instrumentation Lab
Subject Code - EE3L006

CO1	Choose correct instrument for measuring given electrical/ physical quantity.
CO2	Compare various methods and instruments available for measurement of single quantity..
CO3	Apply understanding about instrumentation concepts which can be applied to electrical measurements.
CO4	Analyse the testing and measuring set up for electrical systems
CO5	Evaluate efficiency of different instruments
CO6	Design circuit for measuring given quantity

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4th Semester

Name of Subject - Numerical method and probability
Subject Code - EE4T001

CO1	Define approximation and errors in numerical differentiation and Integration.
CO2	Evaluate the roots of the equation using Bracketing methods: Bisection methods, Open methods: Newton Raphson method
CO3	Apply the Cramer‘s rule, Gauss- Elimination Method, pivoting, scaling, Heun‘s method, Runge–Kutta Method,to engineering problem.
CO4	Analyze the question Newton‘s Cotes Integration Formulas: Trapezoidal Rule, Simpson‘s rule, engineering applications Numerical differentiation using Finite divide Difference method.
CO5	Compute the linear and non linear equation, regression, Interpolation and ordinary differential equation using MATLAB programming
CO6	Develop computer program for linear and non linear equation

Name of Subject - Power Station Practice
Subject Code - EE4T002

CO1	Remember the basic operations of various power plants.
CO2	Understand and interpret the requirements and basics of power plant installation and site selection.
CO3	Apply knowledge to Economic Operation of Power Systems and the knowledge related with its need.
CO4	Analyze various electric power plants operations and distinguish between properties.
CO5	Evaluate thermal, hydro, nuclear, gas power plant also able to Explain its fundamentals.
CO6	Design Economic Operation of Power Systems and also able to give solutions implementation of power plant on its basics.

Name of Subject - Electronic Devices and circuits
Subject Code - EE4T003

CO1	Understand the characteristics of the p-n junction, the diode and some special function diodes and these diodes‘ application in electronic circuits

CO2	Familiarize the operation and applications of transistor like BJT .
CO3	Develop design competence in power amplifiers using BJT.
CO4	Apply the knowledge of amplifier in order to Design various differential amplifier
CO5	Design Various Oscillator Circuits and Understand the concept of FETs as well as MOSFETs
CO6	Apply the knowledge of Digital Electronics in order to develop the truth tables for various logic Gates

Name of Subject - Power System I
Subject Code - EE4T004

CO1	To define basic components of power system and remember the structure of power system
CO2	To understand the working of transmission and distribution system and relate the different parameters of transmission and distribution system
CO3	To do Modeling and representation of the system component used in power system
CO4	To Analyze the per unit system of power system
CO5	To select the proper parameter of power system and determine the value of inductance, capacitance, voltage regulation and efficiency of transmission line and explain the effect of sag and corona on transmission line.
CO6	To create the structure of power system with suitable components and improve the efficiency of power system

Name of Subject - Electrical Machine II
Subject Code - EE4T005

CO1	Define voltage regulation, load torque angle and MMF of windings.
CO2	Classify reactances under transient conditions and effects of variable excitation.
CO3	Apply the method of synchronous impedance and Potier triangle to find voltage regulation.
CO4	Develop phasor diagram of three phase synchronous machine.
CO5	Analyze the V curves and effects of excitation and load on motor operation
CO6	Compare various methods of cooling in synchronous machine.

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Name of Subject - Innovation and entrepreneurship Development
Subject Code - EE4T007

CO1	Discover the creative / innovative side within her/him
CO2	Hone entrepreneurial and leadership skills within his/her personality.
CO3	Develop new ways of thinking and Learn the entire innovation cycle from Ideation to
CO4	GoToMarket.
CO5	Study frameworks, strategies, techniques and business models for conceived ideas.
CO6	Develop skills for evaluating, articulating, refining, and pitching a new product or service.

Name of Subject - Electrical Machine II Lab
Subject Code - EE4L005

CO1	Performance characteristics of synchronous machines using direct and indirect methods
CO2	Regulation of three phase alternator using the predetermination methods
CO3	Saliency nature of synchronous machine
CO4	Starting and Speed control of ac machines
CO5	Synchronization of two three phase alternators
CO6	Measurement of impedances and short circuit ratio of alternator

5th Semester

Name of Subject - ELECTRICAL MACHINE-II
Subject Code -BTEEC501

CO1	To study different methods of speed control of AC and DC motor
CO2	To study importance and procedure of different performance test on AC and DC motor.
CO3	To determine different operating characteristics of AC and DC machines

Name of Subject - POWER SYSTEM-II
Subject Code -BTEEC502

CO1	To study different parameters of power system operation and control

CO2	To study load flow and Diff. methods of reactive power control.
CO3	To understand diff. methods of fault analysis and stability study

Name of Subject - MICROPROCESSOR AND MICRO CONTROLLER
Subject Code -BTEEL503

CO1	To know the architecture of 8085 and 8051.
CO2	To understand interfacing and interrupt features of 8085 and 8051.
CO3	To develop program for basic applications.

Name of Subject - VALUE EDUCATION, HUMAN RIGHTS AND LEGISLATIVE PROCEDURES
Subject Code -BTHM504

CO1	To understand value of education and self-development
CO2	To develop good values and character
CO3	To know Human right and legislative procedure

Name of Subject - ELECTIVE- IV: 1. ILLUMINATION ENGINEERING
Subject Code -BTEEE505

CO1	To get the detailed information about modern lamps and their accessories.
CO2	To get detailed insight of indoor and outdoor illumination system components, its controls and design aspects.
CO3	To know the requirements of energy efficient lighting.
CO4	To introduce the modern trends in the lighting

Name of Subject - ELECTIVE- IV: 2. ADVANCES IN RENEWABLE ENERGY SYSTEMS
Subject Code -BTEEE505

CO1	To know the principle of energy conversion technique from biomass, geothermal and hybrid energy systems.
CO2	To understand effects of air pollution and ecosystems

Name of Subject -ELECTIVE-V 2 POWER PLANT ENGINEERING
Subject Code -BTEEOE506

CO1	To review basic components of power system, energy sources.
CO2	To understand principle of construction and operation of different conventional power plants.

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Name of Subject -ELECTIVE-V. 3. DESIGN AND ANALYSIS OF ALGORITHMS
Subject Code -BTEEOE506

CO1	To know fundamental characteristic of an algorithm.
CO2	To understand strategy of algorithm formation,
CO3	To develop different algorithm.

6th Semester

Name of Subject -CONTROL SYSTEM
Subject Code- BTEEC601

CO1	To understand the behavior of nonlinear control system.
CO2	To design and analyze PID controller.
CO3	To understand and analyze state variable technique.
CO4	To design and analyze suitable control system for engineering application.

Name of Subject -PRINCIPLES OF ELECTRICAL MACHINE DESIGN
Subject Code- BTEEC602

CO1	To understand principles of electric machine design.
CO2	To design different components of electric machine.
CO3	To design Transformer
CO4	To understand CAD and use it for transformer design

Name of Subject -POWER ELECTRONICS
Subject Code - BTEEC603

CO1	To review principle of construction, operation and characteristics of basic semiconductor devices.
CO2	To understand and analyze performance of controlled and uncontrolled converters.
CO3	To understand and analyze performance of DC to DC converters. Dc to AC converters.
CO4	To understand and analyze performance of AC voltage controllers.

Name of Subject -Elective-VI: 1. INDUSTRIAL AUTOMATION AND CONTROL
Subject Code -BTEEE604

CO1	To understand construction and working principle of different industrial measurement systems.
CO2	To understand new trends in industrial process control.

Name of Subject -Elective-VI: 2. DESIGN OF EXPERIMENTS

Subject Code -BTEEE604

CO1	To understand experimental design principles.
CO2	To understand different experimental design used in industry.
CO3	To deign computer experiments to use with engineering problems.

Name of Subject -ELECTIVE-VI: 3. ARTIFICIAL NEURAL NETWORK.
Subject Code -BTEEE604

CO1	To review basic principles of neuron structure.
CO2	To understand building blocks artificial neural network.
CO3	To understand different networks of ANN
CO4	To develop different algorithm for learning.
CO5	To study and understand Fuzzy neural networks.

Name of Subject -ELECTIVE-VII 1. SWITCH GEAR AND PROTECTION.
Subject Code -BTEEC605

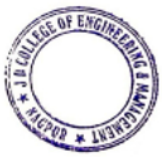
CO1	To understand principles of protective relaying.
CO2	To understand principle of construction, operation and selection of different type of circuit breaker used in power system.
CO3	To understand different protection schemes used in power system operation

Name of Subject -ELECTIVE-VII 2. COMPUTER AIDED ANALYSIS AND DESIGN
Subject Code -BTEEC605

CO1	To study different computer aided tools in engineering application.
CO2	To understand the functionality of different engineering software.
CO3	To apply different software in engineering design.

Name of Subject -ELECTIVE-VII 3. MECHATRONICS
Subject Code -BTEEC605

CO1	To understand concept of mechatronics.
CO2	To understand sensor and transducer construction and operation.
CO3	To understand microprocessor architecture and operation.
CO4	To understand principle of construction and operation of PLC
CO5	To design a robo for engineering application.



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Name of Subject -ELECTIVE- VIII. 1. RURAL TECHNOLOGY AND COMMUNITY DEVELOPMENT
Subject Code- BTEEOE606

CO1	To analysis data, information and knowledge.
CO2	To understand concepts of marketing.
CO3	To identify projects and work for community development
CO4	To understand and analyze business model.

Name of Subject -ELECTIVE- VIII. 2. PROJECT MANAGEMENT
Subject Code- BTEEOE606

CO1	To understand concepts of project management.
CO2	To develop a project plan.
CO3	To understand the project implementation strategy.
CO4	To analyze post project affects.

Name of Subject -ELECTIVE- VIII. 3. KNOWLEDGE MANAGEMENT
Subject Code- BTEEOE606

CO1	To understand different components knowledge management.
CO2	To conduct knowledge audit and knowledge management practices in organization.

7th Semester

Name of Subject -POWER SYSTEM OPERATION AND CONTROL
Subject Code - BTEEC701

CO1	Explain the fundamental concept of power system.
CO2	Design the mathematical model of synchronous machine.
CO3	Design the mathematical model Excitation system and speed governing system.
CO4	Analyze the transient stability of power system using swing equation and equal area criteria.
CO5	Analyze the economic operation of power system.
CO6	Explain the methods of Voltage control.

Name of Subject -HIGH VOLTAGE ENGINEERING
Subject Code - BTEEC702

CO1	Illustrate the concept of electric field stresses, applications of insulating materials and methods for Non-destructive bushings, lightning arrestors, cables, circuit breakers and surge diverters.testing of equipment like transformers, insulators, isolators,

CO2	Explain the breakdown process in solid, liquid, and gaseous materials
CO3	Analyze methods for generation and measurement of High Voltages and Currents (both ac and dc)
CO4	Describe the phenomenon of over-voltage and choose appropriate insulation coordination levels based on IS & IEC Standards.

Name of Subject -ELECTRICAL DRIVES
Subject Code - BTEEC703

CO1	Analyze the dynamics of Electrical Drives system.
CO2	Use various control techniques for controlling the speed of AC and DC motors.
CO3	Analyze the AC and DC drives.
CO4	To Select/recommend the appropriate Drive according to the particular applications.
CO5	State the recent technology of AC and DC drive

Name of Subject -SPECIAL PURPOSE ELECTRICAL MACHINES
Subject Code -BTEEE704

CO1	Demonstrate construction, working principle, and application of various types of special purpose electrical machines
CO2	Select a special Machine for a particular application
CO3	Demonstrate behaviour of induction generator and induction machine.

Name of Subject -ELECTRIC TRACTION & UTILIZATION
Subject Code -BTEEE704

CO1	Identify types of Traction System.
CO2	Interprete Various Power supply in Electric Traction.
CO3	Analyze Various Traction Motors.
CO4	Define methods of Traction motor Control.
CO5	Elobrate Train movement & Breaking in Traction system.
CO6	Classify the indoor and outdoor Illumination system.

Name of Subject -Engineering System Design and Optimization
Subject Code -BTEEE704

CO1	To understand different level optimization problem formulation.
CO2	To study novel methods in optimization.

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CO3	To understand and develop genetic algorithm for engineering problems.

Name of Subject -Financial Management
Subject Code -BTEEE704

CO1	The students would be able to understand and define basic terminology used in finance and accounts
CO2	The students would be able to prepare& appraise Financial Statements and evaluate a company in the light of different measurement systems.
CO3	The students would be able to analyze the risk and return of alternative sources of financing.
CO4	Estimate cash flows from a project, including operating, net working capital, and capital spending.
CO5	To estimate the required return on projects of differing risk ,to estimate the cash flows from an investment project, project, and make a recommendation to accept or reject the projectcalculate the appropriate discount rate, determine the value added from the
CO6	To describe and illustrate the important elements in project finance Using financial calculator and Excel in a variety of problems.

Name of Subject -DIGITAL SIGNAL PROCESSING
Subject Code - BTEEE705

CO1	Represent signals, systems and digital processing of analog signals.
CO2	Represent discrete time signals, systems and analysis of Discrete-Time Linear Time-Invariant Systems.
CO3	Apply digital signal processing techniques to analyze discrete time signals in time domain.
CO4	Apply digital signal processing techniques to analyze discrete time signals in frequency
CO5	Design different filter structure
CO6	Validate system functionality and evaluate results.

Name of Subject -Energy Audit and Conservation
Subject Code - BTEEE705

CO1	To recognize Global Environmental Issues and Role of Renewable & non-conventional energy sources
CO2	To estimate Energy efficiency opportunities in Thermal- Mechanical Systems and Electrical System.

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CO3	To analyze Energy Conservation Proposals economically and prepare audit reports.

Name of Subject -ELECTRICAL POWER QUALITY
Subject Code - BTEEE705

CO1	To study the various power quality issues, their production, monitoring and mitigation.
CO2	To study the various power quality standards.
CO3	To study various power quality monitoring methods.
CO4	To apply appropriate solution techniques for power quality Problems.

Name of Subject -HVDC TRANSMISSION AND FACTS
Subject Code - BTEEE705

CO1	To understand importance, configuration and types of HVDC transmission.
CO2	To analyst the operation of HVDC converter, system control and protection.
CO3	To understand the concept of FACTS, their role, type and functionality.
CO4	To analyze the operation of static series and shunt compensator.

Academic Incharge

HOD EE

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B.TECH. FIRST YEAR
SESSION:2020-21

BRANCH CODE: AII

Course Outcome-2020-21

Course Title : Engineering Mathematics-1 | **Semester : I**
Course Code : MAT001 | **Course Type : Compulsory**
Pre-requisite : Basic knowledge of Mathematics | **L – T – P : 3 – 1– 0**
Stream :Core subject | **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Mathematics
2. To understand the application of Mathematics in engineering and in real life.
3. To investigate the key concepts of Mathematics.
4. To enable students to analyze a problem.

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe rank, Bernoulli's theorem, Taylor's and Maclaurin's theorems for functions of two variables, – Euler's Theorem for functions containing two and three variables, Lagrange's theorem
2. Illustrate the examples of ordinary differential equation, partial differential equation, matrices.
3. Solve questions related to ordinary differential equation, partial differential equation, matrices and their applications.
4. Apply the knowledge of matrices, ordinary differential equation, partial differential equation, and their applications to real world problems.
5. interpret the results of matrices, ordinary differential equation, partial differential equation and their applications.
6. Design a method or modal on matrices, ordinary differential equation, partial differential equation.

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Course Title : Engineering Physics **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI/1T/2T005 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Physics **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1.To provide a firm grounding in the basic physics principles and concept to resolve many Engineering and technological problems.
2.To understand and study the Physics principles behind the developments of Engineering materials.
3.To provide problem solving experience and learning of concepts through it in engineering physics, in both the classroom and the laboratory learning environment.

COURSE OUTCOMES

At the end of the course students will be able to

1.Acquire fundamental understanding of concepts specifically concern to semiconducting materials, Optics, Fibre optics, Ultrasonics, Dielectric Materials, Electron optics, Quantum Mechanics, Crystal structure and Nano-science, and their engineering applications.
2.Develop the ability to recognize the appropriate physics that applies to experiments based on the Engineering Physics.
3.To develop a systematic, logical approach to problem – solving that can be applied to problems in physics and to problems in general.

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Course Title : Engineering Physics-Lab **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI1L/2L005 **Course Type : Compulsory**

Pre-requisite : Basics of Physics Practical **L – T – P : 0 – 0– 2**

Stream :Core subject **Credits : 1**

COURSE OBJECTIVE

Students will be able to

1. Draw the relevance between the theoretical knowledge and to imply it in a practical manner with respect to analyze various electronic circuits and its components.
2. Demonstrate an ability to make physical measurements and understand the limits of precision in measurements.
3. Enhance the comprehensibility of the practical concepts and their application.
4. Apply the analytical techniques and graphical analysis to the experimental data
5. Develop the skills to identify various parts of the apparatus used in the experiment in laboratory.
6. Design and apply the practical knowledge of engineering physics in daily life

COURSE OUTCOME

Students will be able to

1. Visualize and understand the concepts of various phenomenon of light, principle of LASER, Optical fiber and electric and magnetic field.
2. Understand the working principles of Semiconducting devices and their application.
3. Apply the theoretical concepts to demonstrate the ability to measure properties of a variety of electrical and optical systems
4. Analyze the different crystal structure with the help of crystal models.
5. Construct the various devices based on optical phenomenon.
6. Design the frame work of various electronic circuitries based on semiconducting materials.

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SESSION:2020-21

Course Title : Energy and Environment Engineering **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI1T/2T006 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Environment **L – T – P : 3 – 0– 0**

Stream :Theory subject **Credits : 3**

COURSE OBJECTIVES

1. To understand the importance of Energy and Environment
2. To understand the application of energy saving tool in real life.
3. To investigate the key concepts of Energy and Environment.

COURSE OUTCOMES

At the end of the course students will be able to

1) Describe different kind of pollution eg. Water pollution, air pollution, soil pollution etc.

2) Understand the importance of ecosystem for human beings..

3) Discover innovative method of power generation.

4) Correlate the cost of various method of power generation.

5) Judge the quality of air.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Introduction To Computer Programming **Semester : I**

Course Code : HU1T002 **Course Type : Compulsory**

Pr-requisite : Basic knowledge of Computer **L – T – P : 2 – 0– 0**

Stream :Theory subject **Credits : 2**

COURSE OBJECTIVES

1. To understand the importance of Programming
2. To understand the application of C Programming.
3. To investigate the key concepts of C Programming.
4. To enable students build a applications based on C programming

COURSE OUTCOMES

CO1: Define the algorithms, flowcharts, array , pointer, structure ,function , python.

CO2: Discuss and differentiate between variables , operators ,statements , loops, array dimensions.

CO3:Demonstrate working programs using functions, loops ,conditional statements ,array ,pointer, structure and files in C and python language .

CO4:Distinguish between different steps of programming and prioritize levels of programming.

CO5:Find errors and predict outcome in C and python programming.

CO6:Compose and develop any application using C and python programming.

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SESSION:2020-21

Course Title : Introduction To Computer Programming (LAB) **Semester : I**

Course Code : HU1L002 **Course Type : Compulsory**

Pr-requisite : Basic knowledge of Computer **L – T – P : 0 – 0– 4**

Stream : Theory subject **Credits : 2**

COURSE OBJECTIVES

1. To introduce students to the basic knowledge of programming fundamentals of C language.
2. To impart writing skill of C programming to the students and solving problems.
3. To impart the concepts like looping, array, functions, pointers, file, structure

COURSE OUTCOME

After completing this lab course you will be able to:

1. Understand the logic for a given problem.
2. Write the algorithm of a given problem.
3. Draw a flow chart of a given problem.
4. Recognize and understand the syntax and construction of C programming code..
5. Make use of different data-structures like arrays, pointers, structures and files.
6. Know the alternative ways of providing solution to a given problem.

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B.TECH. FIRST YEAR

SESSION:2020-21

Course Title : Workshop Practices **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI 1L/2L001 **Course Type : Compulsory**

Pre-requisite : Basic Knowledge Of Workshop **L – T – P :0 – 0– 4**

Stream :Practical subject **Credits : 2**

Instructions to the student:

Each student is required to maintain a „workshop journal" consisting of drawing / sketches of the jobs and a brief description of tools, equipment, and procedure used for doing the job.

Contents:

a**) Carpentry:** Technical Terms related to wood working, Types of wood, Joining materials, Types of joints - Mortise and Tenon, Dovetail, Half Lap, etc., Methods of preparation and applications, Wood working lathe, safety precautions.

b) Welding: Arc welding - welding joints, edge preparation, welding tools and equipment, Gas welding - types of flames, tools and equipment, Resistance welding - Spot welding, joint preparation, tools and equipment, safety precautions.

c) Fitting: Fitting operation like chipping, filing, right angle, marking, drilling, tapping etc., Fitting hand tools like vices, cold chisel, etc. Drilling machine and its operation.

e) Machine shop: Lathe machine, types of lathes, major parts, cutting tool, turning operations (Demo), safety precautions

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Introduction to A I & Its Application **Semester : I**

Course Code : AI1T008 **Course Type:Compulsory**

Pre-requisite : Basic knowledge of Mathematical Logic **L – T – P :2 – 0– 0**

Stream :Theory subject **Credits : Audit**

COURSE OBJECTIVES

1. To understand the importance of AI and use of AI tools
2. To understand the application of AI in engineering and in real life.
3. To investigate the key concepts of knowledge representation and different notations.
4. To enable students to analyze a problem so that appropriate problem solving techniques may be applied.

COURSE OUTCOMES

Upon successful completion of this course student will able :

1. To understand the basics of Artificial Intelligence , Intelligent Agents and its structure
2. To Apply various searching techniques of Problem solving
3. To Acquire theoretical knowledge about principles for logic-based representation and reasoning
4. To Participate in the design of systems that act intelligently and learn from experience
5. To Understand the relation between AI & various domains

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SESSION:2020-21

Course Title : Engineering Mathematics-II **Semester : II**

Course Code : MA2T001 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Mathematics **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Mathematics

2. To understand the application of Mathematics in engineering and in real life.

3. To investigate the key concepts of Mathematics.

4. To enable students to analyze a problem

COURSE OUTCOMES

At the end of the course students will be able to

1.Describe concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus.

2.Illustrate the concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus by using examples.

3.Apply the knowledge of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.

4.Analyze the problems and results of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.

5.Evaluate the problems by using complex numbers, integral calculus & multiple integrals, Fourier series &transform, vector differential calculus, vector integral calculus to solve the engineering problems.

6.Create the methods or model by using complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.

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Course Title : Engineering Chemistry **Semester : I/ II**

Course Code : ME/CE/EE/ET/IT/CS/AI/1T/2T002 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Chemistry **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Chemistry

2. To understand the application of Chemistry in engineering and in real life.

3. To investigate the key concepts of Chemistry knowledge

4. To enable students to analyze a Chemistry problem so that appropriate problem solving techniques

may be applied.

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe various properties of water, nanomateral, transition metal ions and their magnetic properties, Debye-Hückel theory, Quinonoid theory, various electrode, spectrophotometric techniqes .

2. Illustrate the various types of water, carbon nanotubes, Molecular orbital theory, Transport number by Moving Boundary method, Ostwald's theory of acid-base indicator, various batteries, UV and NMR spectroscopy.

3. Analyze the question on water characteristics, electrochemistry and various types of instrumental titration, various unknown sample by UV and NMR spectroscopy .

4. Apply the Knowledge of zeolite process, Ion exchange process, Hot Lime –Soda process, acid base concept, spectroscopic techniques.

5. Develop a Modal on softening of water, standardization of acid and base by various instruments, doping on band structure, spectroscopic techniques.

6. Organize water as per quality, carbon nanotubes, electrodes, Energy level diagrams of diatomic molecules, various elements as per their spectroscopic techniques.

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Course Title : Engineering Chemistry Practical **Semester : II**

Course Code : ME/CE/EE/ET/IT/CS 1L/2L002 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Chemistry **L – T – P : 0 – 0– 2**

Stream :Theory subject **Credits : 1**

COURSE OBJECTIVES

Students will be able to

1. Students will explore new areas of research in both chemistry and allied fields of science and technology.
2. Students will understand safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.
3. Students will recognize common laboratory techniques including pH measurement, acid/base titrations, UV/Visible spectroscopy.

COURSE OUTCOMES

Students will be able to

1. Recall hardness of water, acid value, saponification number of oils.
2. Demonstrate an ability to make chemical measurements and understand the limits of precision in measurements.
3. Enhance the comprehensibility of the practical concepts and their application.
4. Apply the analytical techniques to the experimental data
5. Making judgments based on criteria and standards through checking and critiquing
6. Design and apply the practical knowledge of engineering chemistry in daily life

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SESSION:2020-21

Course Title : Engineering Graphics **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS1T/2T003 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Graphics **L – T – P : 1 – 0– 0**

Stream :Practical subject **Credits : 1**

COURSE OBJECTIVES

1. To understand the concepts like dimensioning, conventions and standards related to engineering graphics in order to become professionally efficient

2. To understand theory of projection and simple machine parts in first and third angle of projection systems.

3. To understand the key concepts CAD software.

4. To enable students to analyze a 2-dimensional & 3-dimensional problem.

COURSE OUTCOMES

1. Define various concepts like dimensioning, conventions and standards related to engineering graphics in order to become professionally efficient.

2. Interpret drawings of simple machine component in first and third angle of projection systems

3. Apply theory of projections in projection of lines, projection of planes and projection of solid.

4. Classify solid geometry in different positions.

5. Assess the two dimensional and three dimensional drawing in CAD software.

6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using CAD software

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Engineering Graphics-Lab **Semester : II**

Course Code : ME/CE/EE/ET/IT/CS/2L003 **Course Type : Compulsory**

Pre-requisite : Basics of Graphics Lab **L – T – P : 0 – 0– 4**

Stream :Practical subject **Credits : 2**

COURSE OBJECTIVES:

The objective of the course is to enable students to

1. Provide basic foundation in CAD software.
2. Understand the fundamentals used to create and manipulate geometric models.
3. Get acquainted with the basic CAD software for to design geometric modeling.

COURSE OUTCOMES:

1. Define basic structure of CAD workstation, CAD commands, Memory types, input/output devices and display devices to become professionally efficient to operate CAD software.
2. Explain drawing of simple machine component in CAD software.
3. Acquire the knowledge of geometric modeling in CAD software.
4. Analyze the steps required in CAD software for 2-dimensional and 3-dimensional models.
5. Assess the two dimensional and three dimensional drawing in CAD software.
6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using CAD software.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Communication Skills **Semester : I/II**

Course Code : HU1T/2T001 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of English **L – T – P : 2 – 0– 0**

Stream :Theory subject **Credits : 2**

Course Objectives:

The main objective of the subject is to enhance the employability skills of engineering studentsas well as communication skills at work place.

The sub-objectives are:

1) To develop students' reading skills and pronunciation.
2) To develop technical communication skills through drafting, letter writing, and précis writing.
3) To develop literary skills through essay writing.
4) To develop public speaking skills of the students.

Course Outcomes:

At the end of the course students will be able to

1) to better reading comprehension, pronunciation, and functional English grammar.
2) to write letters and resumes
3) to organize their thoughts for effective presentation and writing.
4) to learn skills to present themselves well in an interview, and handle a Group Discussion

To expose the students to the ethics of English language by teaching grammar

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Course Title : Communication Skills-Lab **Semester : II**

Course Code : HU2L001 **Course Type : Compulsory**

Pre-requisite : Basics of English grammar **L – T – P : 0 – 0– 4**

Stream :Theory subject **Credits : 2**

COURSE OBJECTIVES:

1. Apply appropriate communication skills. Students are able to enhance their employability skills as well as communication skills at work place.

2. Demonstrate knowledge of communication theory and application. Students have better reading comprehension, pronunciation, and functional English grammar.

3.Practice critical thinking to develop innovative and well-founded perspectives related to the students' emphases.

4.Build and maintain healthy and effective relationships. Students are able to write letters and resumes.

5.Use technology to communicate effectively in various settings and contexts. Students are able to organize their thoughts for effective presentation and writing.

6.Demonstrate appropriate and professional ethical behavior. Students are able to learn skills to present themselves well in an interview, and handle a Group Discussion

COURSE OUTCOMES

Students will be able to

CO1.Remember Communication Skills by giving adequate exposure in reading, writing,

listening and speaking.

CO2. Understand the communication process by identifying, explaining, and applying current communication theories as they relate to a variety of contexts.

CO3. Apply proficiency, both in spoken and written English.

CO4. Analysing the communication behaviours of others and themselves in a variety of scenario (e.g. interpersonal, intercultural, group, public and professional communication, and mass media).

CO5. Evaluate and organize their thoughts for effective presentation and writing.

CO6. Improve research, organizational, and critical thinking skills by finding and evaluating reference material and organizing and presenting effective messages adapted to specific situations.

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KATOL ROAD, NAGPUR
B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Basics of Electrical and Electronics Engineering **Semester : I/II**
Course Code : ME/CE/EE/ET/IT/CS 2T007 **Course Type : Compulsory**
Pre-requisite : Basic knowledge of Electrical and Electronic **L – T – P : 2-0-0**
Stream : Theory Subject **Credits : 0 (Audit)**

COURSE OBJECTIVES

1. To provide a basic information and use of electrical and electronics components.
2. To understand and study the materials used for the preparation of electrical and electronics components.
3. To provide basic knowledge of operation and functionality of electrical and electronics components.

COURSE OUTCOMES:

1. Define fundamentals of electrical system and choose measuring instruments for measurement of electrical quantities & describe the concept PN junction diode and its characteristics.
2. Classify wiring system and compare energy resources for electrical energy generation & elaborate the transistor configuration in CE, CB & CC mode.
3. Plan and organize the utilization of energy resources of electrical system & apply transistor characteristics to construct Amplifier devices.
4. Compare different sources of electrical system & distinguish various logic gates and simplify the Boolean's equations.
5. Justify the utilization of various electrical and electronics components into electrical and electronics circuitries.
6. Construct various circuits using Resistors, capacitors, inductors, PN junction diode, Zener diode, transformers, transistors and logic gates.

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KATOL ROAD, NAGPUR
B.TECH. FIRST YEAR
SESSION:2020-21

Course Title :	**Introduction to Drones**	**Semester :**	**II**
Course Code :	**AI2T009**	**Course Type :**	**Compulsory**
Pre-requisite :	**Nil**	**L – T – P :**	**2 – 0– 0**
Stream :	**Theory subject**	**Credits :**	**Audit**

Course Objectives

The main aim of this course is to understand the basics of Drones and its various applications. The course will also impart the knowledge of how to fly a drone by considering the rules and regulations to the specific country. Further the students will be introduced to the safety measures to be taken during flight.

Course Outcomes:

Student will be able to

CO1: To introduce the various types of frame design used for the UAV and to accommodate the electronics over the frame to fly UAV.

CO2: To make the students understand the basic working principal behind the electronic components used and its specification to build a drone from scratch.

CO3: To enable the students to identify and understand various functional modules of the controller using a preprogrammed controller used in the UAV.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Basic Civil and Mechanical Engineering | **Semester : I/II**
Course Code : ME/CE/EE/ET/IT/CS/1T004 | **Course Type : Compulsory**
Pre-requisite : Basic knowledge of Graphics | **L – T – P : 2 – 0– 0**
Stream : Theory subject | **Credits : 0 (Audit)**

COURSE OBJECTIVES :

1. To understand the basic stream of Mechanical Engineering and Civil Engineering.
2. To understand the concepts of product manufacturing, Energy engineering, design engineering, Automobile engineering, construction technique and civil surveying.
3. To have basic knowledge of Casting, Machining, Designing, Manufacturing, different materials for building construction and surveying.

COURSE OUTCOMES:
Students would be able to

1. Define basic stream of Mechanical & Civil Engineering.
2. Explain the concepts of product manufacturing, Energy engineering, design engineering, Automobile engineering, construction technique and civil surveying.
3. Apply Basic knowledge of Casting, Machining, Designing, Manufacturing & Civil Construction technique.
4. Analyzed the different mechanical system and properties of construction & surveying material.
5. Interpret the problem in mechanical system and civil structure.
6. Solve the problem in mechanical system and civil structure.

BoS Chairman
Chairman
BOS (Basic Science & Humanities)
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VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

Course Name- Multivariate Calculus
Course Code- ET3T001
Semester- III
Credits- 3

Course outcomes:

Students will be able to:

1. Describe properties of Laplace transform, Convolution Theorem, Fourier integral theorem, Parseval's identity, Cauchy's integral theorem, Cauchy's residue theorem.
2. Illustrate the examples using Laplace transform, Fourier Transform, Partial differential equation, Function of Complex Variables, Matrices.
3. Apply the knowledge of Laplace transform, Z-transform, function of complex variable, Advance partial differential equation.
4. Analyze the question on Laplace transform, Fourier Transform, Partial differential equation, Function of Complex Variables
5. Create a modal using Laplace transform, Fourier Transform, Theory of probability, Function of Complex Variables, Matrices.

Course Name- Electronics Devices and Circuits-I
Course Code- ET3T002
Semester- III
Credits- 4
Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Explain the working principle, operation and characteristics of basic solid state devices such as PN junction diode, BJT and JFET.
2. Apply the concept of biasing techniques and feedback to improve stability of circuits.
3. Categorize amplifiers and oscillators based on feedback topology.
4. Analyse different amplifier configurations and DC bias circuitry of BJT.
5. Interpret BJT circuits for small signal at low and high frequencies.
6. Design Electronic circuits using diodes and transistors.

Course Name- Analog Communication System

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Course Code- ET3T003
Semester- III
Credits- 3
Course Outcomes:

At the end of this course, the students should be able to,

1. Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system.
2. Distinguish between different types of analog modulation techniques based on bandwidth Occupied and power transmitted.
3. Analyze the performance of analog communications in the presence of noise by evaluating the figure of merit for different schemes of modulation
4. Evaluate different components of analog communication systems such as modulator, demodulator, mixer, receiver etc in time and frequency domain.
5. Design the modulators, demodulators for amplitude and frequency modulated systems.
6. Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.

Course Name- Digital Circuits and Microprocessor
Course Code- ET3T004
Semester- III
Credits- 3
Course Outcomes:

Students will be able to:

1. Define Logic Families and Programmable Devices and understand the architecture of logic families and combinational digital circuits and describe the basic concept and interrupts in microprocessors.
2. Classify SOP and POS forms, combinational and sequential circuits, synchronous and asynchronous circuits.
3. Apply the principles of Boolean algebra to manipulate, minimize design logic circuits using logic gates and K-map and Use HDL & appropriate EDA tool for digital logic design and simulation.
4. Analyze combinational logic circuits and sequential circuits.
5. Recommend various combinational logic circuits like code converters, multiplexers, adders in the design of complex hierarchical combinational blocks like multipliers, fast adders etc and Validate sequential logic circuits elements like latches, flip-flops for counters, registers, simple finite state machine and similar circuits.
6. Design modular combinational circuits, synchronous sequential logic circuits and interface various devices with microprocessor.

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Course Name- Integrated Circuit and Applications
Course Code- ET3T005
Semester- III
Credits- 4
Course Outcomes:

Students will be able to:

1. Understand and explain the basic concepts of OPAMP.
2. Demonstrate the working principle of various analog circuits.
3. Conduct experiments using analog electronic components, electronic instruments and modern tool.
4. Analyze analog circuits to evaluate various performance parameters.
5. Compare multivibrator circuits, Data converters.
6. Design and realize filters, Oscillators, linear and non-linear applications of Op-Amp.

Course Name- Network Synthesis and Analog Filter
Course Code- ET3T006
Semester- III
Credits- 3
Course Outcomes:

Students will be able to:

1. Define various terminologies and network theorems.
2. Understand the basics of Network synthesis and analog filters.
3. Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze the same.
4. Analyze steady state and transient response of electrical circuits
5. Characterize the transfer function for two – port networks.
6. Design various electrical circuits using network theorems.

Course Name- Electronics Devices and Circuits-I Lab
Course Code- ET3L002
Semester- III
Credits- 1
Course Outcomes:

At the end of the laboratory work, students will demonstrate the ability to:

1. Acquire the basic concepts of different semiconductor components and understand the use of semiconductor devices in different electronic circuits.
2. Identify basic devices such as diodes, BJT and JFET from their package information by referring to manufacturer's data sheets.
3. Plot and study the characteristics of semiconductor devices.
4. Simulate Electronic circuits using SPICE.
5. Calculate different performance parameters of transistor.
6. Design, build and test the performance of various circuits.

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Course Name- Analog Communication System Lab
Course Code- ET3L003
Semester- III
Credits- 1
Course Outcomes:

Students will be able to:

1. Observe SSB detection techniques.
2. Realize various modulation technique..
3. Generate signals using Scilab.
4. Identify and design different analog modulation techniques.
5. Analyze multiplexing systems such as FDM, TDM and QAM.
6. Compare different communication systems by analysing in time and frequency domain.

Course Name- Digital Circuits and Microprocessor Lab
Course Code- ET3L004
Semester- III
Credits- 1
Course Outcomes:

Students will be able to:

1. Find and prevent various hazards and timing problems in a digital design.
2. Understand the fundamental of basic gates and their use in combinational and sequential circuits Outline the use of digital components as a switching elements.
3. Develop ability to handle arithmetic operations using assembly language programming.
4. Analyze basic arithmetic and logical circuits required in microcomputer systems.
5. Examine the structure of various number systems and its application in digital design.
6. Design various combinational and sequential circuits and develop skill to build, and troubleshoot cost effective digital circuits.

Course Name- Innovation and Entrepreneurship Development
Course Code- ET3T008
Semester- III
Credits- Audit

Course Outcomes:

At the end of the course students will be able to

1. Identify and validate of ideas.
2. Remember Patent registration of Innovation.
3. Understand roles and responsibilities of Entrepreneurship

Course Name- Partial Differential Equation and Numerical Methods
Course Code- ET4T001
Semester- IV
Credits- 3

Course Outcomes:

At the end of course students will be able to

1. Understand calculation and interpretation of various errors in numerical methods and partial differential equations.
2. Familiar with finite precision computation.
3. Solve nonlinear equations in a single variable and find numerical solutions.
4. Apply Numerical analysis which has enormous application in the field of science and some fields of Engineering.
5. Analyze the numerical integration and differentiation, numerical solution of ordinary differential equation.
6. Design mathematical model for various electronic applications.

Course Name- Basics of Python Programming
Course Code- ET4T002
Semester- IV
Credits- 3

Course Outcomes:

Students will be able to

1. Remember variables, types, operators,data structures, arguments, object oriented programming and libraries.
2. Understand assignment, keyword, expressions, lists, modules, exceptions and standard libraries.
3. Apply variables, types, operators, data structures, arguments, object oriented programming and Libraries.
4. Analyse modern updates in python for keyword, expressions, lists, modules, exceptions, standard libraries.
5. Evaluate storage space required to program python scripts, variables, types, operators and data structures.
6. Create python code to make functional Electronics hardware.

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Course Name- Electrical Machines and Instruments
Course Code- ET4T003
Semester- IV
Credits- 3

Course outcomes:

Students will be able to:

1. Remember basic principles & construction, of electrical instruments and ac & dc machines.
2. Understand the operation, performance and characteristics of electrical instruments and ac & dc machines.
3. To identify the different issues related to the electrical instruments, speed control and torque improvement in ac & dc machines.
4. Analyse the performance indices of electrical instruments and ac & dc machines. Dcmachines during various conditions..
5. Evaluate the operation of ac and dc machines along with the testing of electrical instruments.
6. Solve the different problems related to operation, & performance indices of electrical instruments ac and dc machines.

Course Name- Electronics Devices and Circuits-II
Course Code- ET4T004
Semester- IV
Credits- 3

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Explain the working principle, operation and characteristics of Semiconductor devices such as MOSFET
2. Apply Knowledge of semiconductor devices and concepts to implement various electronic circuits.
3. Analyze different amplifier configurations.
4. Evaluate the small signal model and performance parameters of the device.
5. Design different oscillator circuits for various frequencies
6. Build and test the performance of electronic circuits

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Course Name- Signal and System
Course Code- ET4T005
Semester- IV
Credits- 3

Course Outcomes:

1. Understanddifferent types of signals & systems.
2. Familiar with the properties of LTI (Linear Time Invariant System) system and process involved in analysis of signals before transmission.
3. Solve various complex mathematical problems for signal analysis and conversion of signals from one domain to another.
4. Apply knowledge of sampling and interpolation to sample and reconstruct signals during real time signal transmission and reception.
5. Analyze continuous and discrete systems in time and frequency domain.
6. Design Various Mathematical models to Investigate stability of the system.

Course Name- Electromagnetic Fields
Course Code- ET4T006
Semester- IV
Credits- 4

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Understand characteristics and wave propagation on high frequency transmission lines
2. Carryout impedance transformation on TL
3. Use sections of transmission line sections for realizing circuit elements
4. Characterize uniform plane wave
5. Calculate reflection and transmission of waves at media interface
6. Analyze wave propagation on metallic waveguides in modal form
7. Understand principle of radiation and radiation characteristics of an antenna

Course Name- Electrical Machines and Instruments Lab
Course Code- ET4L003
Semester- IV
Credits- 1

Course Outcomes:

Students will be able to:

1. Remember basic principles & construction, of electrical instruments and ac & dcmachines.
2. Understand the operation, performance and characteristics of electrical instruments andac & dc machines.
3. To identify the different issues related to the electrical instruments, speed control andtorque improvement in ac & dc machines.

4. Analyse the performance indices of electrical instruments and ac & dc machines.
5. Evaluate the operation of ac and dc machines along with the testing of electricalinstruments.
6. Solve the different problems related to operation, & performance indices of electrical instruments ac and dc machines.

Course Name- Electronic Circuit and Devices-II Lab
Course Code- ET4L004
Semester- IV
Credits- 1

Course Outcomes:

At the end of the laboratory work, students will demonstrate the ability to:

1. Acquire the basic concepts of different semiconductor components and understand theuse of semiconductor devices in different electronic circuits.
2. Plot and study the characteristics of semiconductor devices like MOSFET, UJT
3. Simulate Electronic circuits using SPICE.
4. Calculate different performance parameters of transistor.
5. Design, build, and test the performance of various circuits.

Course Name- Signal and System Lab
Course Code- ET4L005
Semester- IV
Credits- 1

Course Outcomes:

Upon successful completion of this course the students will be able to:

1. Understand basics of Scilab syntax, functions and programming.
2. Familiar With characterization of various continuous and discrete time signals.
3. Solve the Problems on basic operations on the signals.
4. Apply Knowledge of linear time-invariant (LTI) systems for computing its response.
5. Analyze the spectral characteristics of signals using various transforms.
6. Design the Mathematical model of systems using various transforms.

Course Name- Universal Human Values
Course Code- ET4T007
Semester- IV
Credits- Audit

Course Objective:

The objective of the course is four fold:

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1.Development of a holistic perspective based on self-exploration aboutthemselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

Course Name- Electromagnetic Field Theory
Course Code- BTEXC501
Semester- V
Credits- 3

Course Outcomes:
At the end of this course students will demonstrate the ability to
1. Understand characteristics and wave propagation on high frequency transmission lines
2. Carryout impedance transformation on TL
3. Use sections of transmission line sections for realizing circuit elements
4. Characterize uniform plane wave
5. Calculate reflection and transmission of waves at media interface
6. Analyze wave propagation on metallic waveguides in modal form
7. Understand principle of radiation and radiation characteristics of an antenna

Course Name- Control System Engineering
Course Code- BTEXC502
Semester- V
Credits- 3

Course Outcomes:
At the end of this course, students will demonstrate the ability to
1. Understand the modeling of linear-time-invariant systems using transfer function and state-space representations.
2. Understand the concept of stability and its assessment for linear-time invariant systems.
3. Design simple feedback controllers.

Course Name- Computer Architecture
Course Code- BTETC503
Semester- V
Credits- 3
Course Outcomes:
At the end of this course students will demonstrate the ability to
1. Learn how computers work

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2. Know basic principles of compute's working
3. Analyze the performance of computers
4. Know how computers are designed and built
5. Understand issues affecting modern processors (caches, pipelines etc.).

Course Name- Digital Signal Processing
Course Code- BTEXC504
Semester- V
Credits- 3

Course Outcomes:
After successfully completing the course students will be able to
1. Understand use of different transforms and analyze the discrete time signals and systems.
2. Realize the use of LTI filters for filtering different real world signals.
3. Capable of calibrating and resolving different frequencies existing in any signal.
4. Design and implement multistage sampling rate converter.
5. Design of different types of digital filters for various applications.

Course Name- Microcontroller and its Applications
Course Code- BTEXC505
Semester- V
Credits- 3

Course Outcomes:
1. Learner gains ability to apply knowledge of engineering in designing different case studies.
2. Students get ability to conduct experiments based on interfacing of devices to or interfacing to real world applications**.**
3.Graduates will be able to design real time controllers using microcontroller based system.
4.Students get ability to interface mechanical system to function in multidisciplinary system like in robotics, Automobiles.
5.Students can identify and formulate control and monitoring systems using microcontrollers.
6. Students will design cost effective real time system to serve engineering solution for Global, social and economic context.
7. Learners get acquainted with modern tools like Programmers, Debuggers, cross compilers and current IDE i.e. integrated development environment tools.
8. Learn importance of microcontroller in designing embedded application.
9. Learn use of hardware and software tools.
10. Develop interfacing to real world device.

Course Name- Probability Theory and Random Processes
Course Code- BTEXPE506A
Semester- V
Credits- 3

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Understand representation of random signals

2. Investigate characteristics of random processes

3. Make use of theorems related to random signals

4. To understand propagation of random signals in LTI systems**.**

Course Name- Data Structure & Algorithms Using Java Programming

Course Code- BTEXPE506C

Semester- V

Credits- 3

Course Outcomes:

On completion of the course, student will be able to:

1. To impart the basic concepts of data structures and algorithms.

2. To understand concepts about searching and sorting techniques

3. Describe how arrays, records, linked structures are represented in memory and use them in algorithms.

4. To understand basic concepts about stacks, queues, lists trees and graphs.

5. To enable them to write algorithms for solving problems with the help of fundamental data structures.

Course Name- Introduction to MEMS

Course Code- BTEXPE506D

Semester- V

Credits- 3

Course Outcomes:

At the end of the course the students will be able to

1. Appreciate the underlying working principles of MEMS and NEMS devices.

2. Design and model MEM devices.

Course Name- Antennas and Wave Propagation

Course Code- BTETC601

Semester- VI

Credits- 3

Course Outcomes:

After successfully completing the course students will be able to

1. Formulate the wave equation and solve it for uniform plane wave.

2. Analyze the given wire antenna and its radiation characteristics.

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3. Identify the suitable antenna for a given communication system.

Course Name- Computer Network & Cloud Computing

Course Code- BTETC602

Semester- VI

Credits- 3

Course Outcomes:

1. To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
2. To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
3. To be familiar with wireless networking concepts.
4. To be familiar with contemporary issues in networking technologies.
5. To be familiar with network tools and network programming.
6. For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component.
7. For a given problem related TCP/IP protocol developed the network programming.
8. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP,

Course Name- Digital Image Processing

Course Code- BTETC603

Semester- VI

Credits- 3

Course Outcomes:

After completion of this course students will be able to

1. Review the fundamental concepts of digital image processing system.
2. Analyze images in the frequency domain using various transforms.
3. Categories various compression techniques.
4. Interpret image segmentation and representation techniques.

Course Name- CMOS Design

Course Code- BTETPE604A

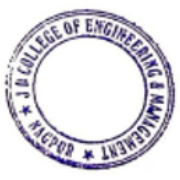
Semester- VI

Credits- 3

Course Outcomes:

At the end of the course the students will be able to

1. Design different CMOS circuits using various logic families along with their circuit layout.
2. Use tools for VLSI IC design.



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Course Name- Information Theory and Coding

Course Code- BTETPE604B

Semester- VI

Credits- 3

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1. Understand the concept of information and entropy
2. Understand Shannon‟s theorem for coding
3. Calculation of channel capacity
4. Apply coding techniques.

Course Name- Power Electronics

Course Code- BTETPE604C

Semester- VI

Credits- 3

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Build and test circuits using power devices such as SCR
2. Analyze and design controlled rectifier, DC to DC converters, DC to AC inverters,
3. Learn how to analyze these inverters and some basic applications.
4. Design SMPS.

Course Name- Nano Electronics

Course Code- BTETPE604D

Semester- VI

Credits- 3

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1. Understand various aspects of nano-technology and the processes involved in making nano components and material.
2. Leverage advantages of the nano-materials and appropriate use in solving practical problems.

Course Name- Android Programming

Course Code- BTETPE604F

Semester- VI

Credits- 3

Course Outcomes:

At the end of the course, students will demonstrate the ability to write simple GUI applications, use built-in widgets and components, work with the database to store data locally, and much more.

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Course Name- Digital System Design

Course Code- BTETOE605A

Semester- VI

Credits- 3

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Design and analyze combinational logic circuits
2. Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder
3. Design & analyze synchronous sequential logic circuits
4. Use HDL & appropriate EDA tools for digital logic design and simulation.

Course Name- Optimization Techniques

Course Code- BTETOE605B

Semester- VI

Credits- 3

Course Outcomes:

After completion of this course students will be able to

1. Cast engineering minima/maxima problems into optimization framework
2. Learn efficient computational procedures to solve optimization problems

Course Name- Project Management and Operation Research

Course Code- BTETOE605C

Semester- VI

Credits- 3

Course Outcomes:

Student will be able to

1. Apply operations research techniques like L.P.P, scheduling and sequencing in industrial optimization problems.
2. Solve transportation problems using various OR methods.
3. Illustrate the use of OR tools in a wide range of applications in industries.
4. Analyze various OR models like Inventory, Queing, Replacement, Simulation, Decision etc and apply them for optimization.
5. Gain knowledge on current topics and advanced techniques of Operations Research for industrial solutions.

Course Name- Augmented, Virtual and Mixed Reality

Course Code- BTETOE605D

Semester- VI

Credits- 3

Course Outcomes:

After completion of this course students will be able to

1. To develop 3D virtual environments.
2. To develop 3D interaction techniques and immersive virtual reality applications.

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Course Name- Python Programming
Course Code- BTETOE605E
Semester- VI
Credits- 3
Course Outcomes:
1. Experience with an interpreted Language.
2. To build software for real needs
3. Prior Introduction to testing software.

Course Name- Web Development and Design
Course Code- BTETOE605F
Semester- VI
Credits- 3
Course Outcomes:
On completion of the course, student will be able to:
1. Develop the skill & knowledge of Web page design
2. Understand the knowhow and can function either as an entrepreneur or can take up jobs in the multimedia and Web site development studio and other information technology sectors.

Course Name- Employability & Skill Development
Course Code- BTHM606
Semester- VI
Credits- 2
Course Outcomes:
On completion of the course, student will be able to:
1. Have skills and preparedness for aptitude tests.
2. Be equipped with essential communication skills (writing, verbal and non-verbal)
3. Master the presentation skill and be ready for facing interviews.
4. Build team and lead it for problem solving.

Course Name- Digital Communication
Course Code- BTETC701
Semester- VII
Credits- 3
Course Outcomes:

1. Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.
2. Perform the time and frequency domain analysis of the signals in a digital communication system.
3. Select the blocks in a design of digital communication system.
4. Analyze Performance of spread spectrum communication system.

Course Name- Microwave Theory and Techniques

Course Code- BTETPE702A

Semester- VII

Credits- 3

Course Outcomes:

After successfully completing the course students will be able to

1. Formulate the wave equation in wave guide for analysis.
2. Identify the use of microwave components and devices in microwave applications.
3. Understand the working principles of all the microwave tubes.
4. Understand the working principles of all the solid state devices.
5. Choose a suitable microwave tube and solid state device for a particular application.
6. Carry out the microwave network analysis.
7. Choose a suitable microwave measurement instruments and carry out the required measurements.

Course Name- RF Circuit Design

Course Code- BTETPE702B

Semester- VII

Credits- 3

Course Outcomes:

After successfully completion of the course students will be able to

1. Understand behavior of passive components at high frequency and modeling of HF circuit.
2. Design HF amplifiers with gain bandwidth parameters.
3. Understand Mixer types and characteristics.
4. Gain the knowledge about PLLs and Oscillators with respect to their circuit topologies

Course Name- Satellite Communication

Course Code- BTETPE702C

Semester- VII

Credits- 3

Course Outcomes:

At the end of the course, the students will have:

1. Knowledge of theory and practice related to radar and Satellite communication.
2. Ability to identify, formulate and solve engineering problems related to radar and Satellite communication.
3. The student would be able to analyze the various aspects of establishing a geo-stationary satellite communication link.
4. Acquired knowledge about Satellite Navigation System.
5. Acquired knowledge about Radar and Radar Equations.

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Course Name- Fiber Optic Communication

Course Code- BTETPE702D

Semester- VII

Credits- 3

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1. Understand the principles fiber-optic communication, the components and the bandwidth advantages.
2. Understand the properties of the optical fibers and optical components.
3. Understand operation of lasers, LEDs, and detectors.
4. Analyze system performance of optical communication systems.
5. Design optical networks and understand non-linear effects in optical fibers.

Course Name- Wireless Sensor Networks

Course Code- BTETPE702E

Semester- VII

Credits- 3

Course Outcomes:

At the end of the course the students will be able to

1. Design wireless sensor networks for a given application
2. Understand emerging research areas in the field of sensor networks
3. Understand MAC protocols used for different communication standards used in WSN
4. Explore new protocols for WSN.

Course Name- Mobile Computing

Course Code- BTETPE702F

Semester- VII

Credits- 3

Course Outcomes:

At the end of the course, the student will be able to demonstrate:

1. A working understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities
2. The ability to develop applications that are mobile-device specific and demonstrate current practice in mobile computing contexts.

Course Name- Embedded System Design

Course Code- BTETPE703A

Semester- VII

Credits- 3

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1. Suggest design approach using advanced controllers to real-life situations.
2. Design interfacing of the systems with other data handling / processing systems.
3. Appreciate engineering constraints like energy dissipation, data exchange speeds etc.
4. Get to know the hardware – software co design issues and testing methodology for embedded system.

Course Name- Artificial Intelligence Deep Learning
Course Code- BTETPE703B
Semester- VII
Credits- 3
Course Outcomes:
This course will enable students to
1. Identify the AI based problems.
2. Apply techniques to solve the AI problems.
3. Define learning and explain various logic inferences.
4. Discuss different learning techniques.

Course Name- VLSI Design & Technology
Course Code- BTETPE703C
Semester- VII
Credits- 3
Course Outcomes:

After successfully completing the course, students will be able to
1. Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
2. Understand chip level issues and need of testability.
3. Design analog & digital CMOS circuits for specified applications

Course Name- Data Compression & Encryption
Course Code- BTETPE703D
Semester- VII
Credits- 3
Course Outcomes:
At the end of this course
1. The student will have the knowledge of Plaintext, cipher text, RSA and other cryptographic algorithm.
2. The student will have the knowledge of Key Distribution, Communication Model, Various models for data compression.

Course Name- Big Data Analytics
Course Code- BTETPE703E
Semester- VII
Credits- 3

Course Outcomes:

At the end of this course, Students will able to:
1. Explain the motivation for big data systems and identify the main sources of Big Data in the real world.
2. Demonstrate an ability to use frameworks like Hadoop, NOSQL to efficiently store retrieve and process Big Data for Analytics.
3. Implement several Data Intensive tasks using the Map Reduce Paradigm
4. Apply several newer algorithms for Clustering Classifying and finding associations in Big Data.

Course Name- Cyber Security
Course Code- BTETPE703F
Semester- VII
Credits- 3
Course Outcomes:

Students should be able to understand.
1. The difference between threat, risk, attack and vulnerability.
2. How threats materialize into attacks.
3. Where to find information about threats, vulnerabilities and attacks.
4. Typical threats, attacks and exploits and the motivations behind them.

Course Name- Consumer Electronics
Course Code- BTETPE704A
Semester- VII
Credits- 3
Course Outcomes:

Students will be able to:
1. List technical specification of electronics Audio system (microphone and speaker)
2. Trouble shoots consumer electronics products like TV, washing machine and AC.
3. Identify and explain working of various color TV transmission blocks.
4. Adjust various controls of color TV receiver and troubleshoot it.
5. Use various functions of Cam coder and shoot a video and take snapshots and save them in appropriate format.

Course Name- Analog Integrated Circuit Design
Course Code- BTETPE704B
Semester- VII
Credits- 3
Course Outcomes:

After the successful completion of this course, Students will be able to:

1. Describe the models for active devices in MOS and Bipolar IC technologies.
2. Describe layout considerations for active and passive devices in analog ICs.
3. Analyze and design IC current sources and voltage references.
4. Describe the noise sources and models applicable to ICs.
5. Understand and appreciate the importance of noise and distortion in analog circuits.
6. Analyze integrated circuit noise performance.
7. Analyze and design IC operational amplifiers.

Course Name- Soft Computing
Course Code- BTETPE704C
Semester- VII
Credits- 3
Course Outcomes:

After the successful completion of this course, students will be able to:
1. Use a new tool /tools to solve a wide variety of real world problems.
2. Find an alternate solution, which may offer more adaptability, resilience and optimization.
3. Identify the suitable antenna for a given communication system.
4. Gain knowledge of soft computing domain which opens up a whole new career option.
5. Tackle real world research problems.

Course Name- Advance Industrial Automation-1
Course Code- BTETPE704D
Semester- VII
Credits- 3
Course Outcomes:

After the successful completion of this course, the student will be able:
1. To identify suitable automation hardware for the given application.
2. To recommend appropriate modeling and simulation tool for the given manufacturing application.

Course Name- Mechatronics
Course Code- BTETPE704E
Semester- VII
Credits- 3
Course Outcomes:

1. Identification of key elements of mechatronics system and its representation in terms of block diagram.
2. Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O.
3. Interfacing of Sensors, Actuators using appropriate DAQ micro-controller.
4. Time and Frequency domain analysis of system model (for control application).

5. PID control implementation on real time systems.
6. Development of PLC ladder programming and implementation of real life system.

Course Name- Entrepreneurship Development
Course Code- BTETPE801A
Semester- VII
Credits- 3
Course Outcomes:

After the completion of the course, the students will be able to:
1. Have the ability to discern distinct entrepreneurial traits.
2. Know the parameters to assess opportunities and constraints for new business ideas.
3. Understand the systematic process to select and screen a business idea.
4. Design strategies for successful implementation of ideas.
5. Write a business plan.

Course Name- Mixed Signal Design
Course Code- BTETPE801B
Semester- VII
Credits- 3
Course Outcomes:
At the end of the course, students will demonstrate the ability to:
1. Understand the practical situations where mixed signal analysis is required.
2. Analyze and handle the inter-conversions between signals.
3. Design systems involving mixed signals.

Course Name- Bio-medical Signal Processing
Course Code- BTETPE801C
Semester- VII
Credits- 3
Course Outcomes:

After successfully completing the course students will be able to:
1. The student will be able to model a biomedical system
2. The student will be able to understand various methods of acquiring bio signals.
3. The student will be able to understand various sources of bio signal distortions and its Remedial techniques
4. The students will be able to analyze ECG and EEG signal with characteristic feature points.
5. The student will have a basic understanding of diagnosing bio-signals and classifying them.

Course Name- Multirate Digital Signal Processing
Course Code- BTETPE801D
Semester- VII

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Credits- 3
Course Outcomes:

After successfully completing the course students will have:
1. Ability to understand the concepts of sampling rate conversions, Decimation and Interpolation as part of Signal Processing techniques.
2. Able to explain how the multirate implementation of ADC and DAC converters works.
3. Able to describe basic sampling rate conversion algorithms.
4. Able to draw and describe different kinds of interpolator and decimator.
5. Able to analyze how the interpolated FIR filter works.
6. Able to do sampling rate conversion.

Course Name- Wavelet Theory
Course Code- BTETPE801E
Semester- VII
Credits- 3
Course Outcomes:

At the end of the course, students will demonstrate the ability to:
1. Understand time-frequency nature of the signals.
2. Apply the concept of wavelets to practical problems.
3. Mathematically analyze the systems or process the signals using appropriate wavelet functions.

Course Name- Mobile Communication & Networks
Course Code- BTETPE802B
Semester- VII
Credits- 3
Course Outcomes:

At the end of the course, students will demonstrate the ability to:
1. Understand the working principles of the mobile communication systems.
2. Understand the relation between the user features and underlying technology.
3. Analyze mobile communication systems for improved performance.

Course Name- Geo-Informatics and Spatial Computing
Course Code- BTETPE802C
Semester- VII
Credits- 3
Course Outcomes:

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At the end of the course, students will be able to map, analyze, manipulate and store

geographical data in order to provide solutions to real world problems and help in planning for the future.

Course Name- Software Defined Radio
Course Code- BTETPE802D
Semester- VII
Credits- 3
Course Outcomes:

1. The student will study Needs, Characteristics, Benefits and Design Principles of a Software Radio.
2. The student will be study design aspects of software radios.
3. The student will understand concept of Smart Antennas.
4. The student will study key hardware elements and related Trade-Offs.

Course Name- Advanced Industrial Automation 2
Course Code- BTETOE803A
Semester- VII
Credits- 3
Course Outcomes:

1. Select & identify suitable automation hardware for the given application.
2. Describe & explain potential areas of automation.
3. Differentiate various control aspects of automation.
4. Demonstrate the self-learning capability of Industrial Automation.

Course Name- IoT Based Embedded System Design
Course Code- BTETOE803B
Semester- VII
Credits- 3
Course Outcomes:

At the end of the course, students will demonstrate the ability to:
1. Understand the practical situations where mixed signal analysis is required.
2. Analyze and handle the inter-conversions between signals.
3. Design systems involving mixed signals.

Course Name- Industrial Drives and control
Course Code- BTETOE803C
Semester- VII
Credits- 3
Course Outcomes:

At the end of the course, students will demonstrate the ability to gain an ability to design and

conduct performance experiments, as well as to identify, formulate and solve drives related problems.

Course Name- Robotics Design
Course Code- BTETOE803D
Semester- VII
Credits- 3
Course Outcomes:

At the end of the course, students will demonstrate the ability to:
1. Describe kinematics and dynamics of stationary and mobile robots
2. Describe trajectory planning for robots.
3. Implement trajectory generation and path planning various algorithms
4. Work in interdisciplinary projects.

Dr. Pravin Kshirsagar
HOD

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BRANCH CODE: All

Course Outcome-2020-21

Course Title : Engineering Mathematics-1 | **Semester : I**
Course Code : MAT001 | **Course Type : Compulsory**
Pre-requisite : Basic knowledge of Mathematics | **L – T – P : 3 – 1– 0**
Stream :Core subject | **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Mathematics
2. To understand the application of Mathematics in engineering and in real life.
3. To investigate the key concepts of Mathematics.
4. To enable students to analyze a problem.

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe rank, Bernoulli's theorem, Taylor's and Maclaurin's theorems for functions of two variables, – Euler's Theorem for functions containing two and three variables, Lagrange's theorem
2. Illustrate the examples of ordinary differential equation, partial differential equation, matrices.
3. Solve questions related to ordinary differential equation, partial differential equation, matrices and their applications.
4. Apply the knowledge of matrices, ordinary differential equation, partial differential equation, and their applications to real world problems.
5. interpret the results of matrices, ordinary differential equation, partial differential equation and their applications.
6. Design a method or modal on matrices, ordinary differential equation, partial differential equation.

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Course Title : Engineering Physics **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI/1T/2T005 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Physics **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1.To provide a firm grounding in the basic physics principles and concept to resolve many Engineering and technological problems.
2.To understand and study the Physics principles behind the developments of Engineering materials.
3.To provide problem solving experience and learning of concepts through it in engineering physics, in both the classroom and the laboratory learning environment.

COURSE OUTCOMES

At the end of the course students will be able to

1.Acquire fundamental understanding of concepts specifically concern to semiconducting materials, Optics, Fibre optics, Ultrasonics, Dielectric Materials, Electron optics, Quantum Mechanics, Crystal structure and Nano-science, and their engineering applications.
2.Develop the ability to recognize the appropriate physics that applies to experiments based on the Engineering Physics.
3.To develop a systematic, logical approach to problem – solving that can be applied to problems in physics and to problems in general.

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Course Title : Engineering Physics-Lab **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI1L/2L005 **Course Type : Compulsory**

Pre-requisite : Basics of Physics Practical **L – T – P : 0 – 0– 2**

Stream :Core subject **Credits : 1**

COURSE OBJECTIVE

Students will be able to

1. Draw the relevance between the theoretical knowledge and to imply it in a practical manner with respect to analyze various electronic circuits and its components.
2. Demonstrate an ability to make physical measurements and understand the limits of precision in measurements.
3. Enhance the comprehensibility of the practical concepts and their application.
4. Apply the analytical techniques and graphical analysis to the experimental data
5. Develop the skills to identify various parts of the apparatus used in the experiment in laboratory.
6. Design and apply the practical knowledge of engineering physics in daily life

COURSE OUTCOME

Students will be able to

1. Visualize and understand the concepts of various phenomenon of light, principle of LASER, Optical fiber and electric and magnetic field.
2. Understand the working principles of Semiconducting devices and their application.
3. Apply the theoretical concepts to demonstrate the ability to measure properties of a variety of electrical and optical systems
4. Analyze the different crystal structure with the help of crystal models.
5. Construct the various devices based on optical phenomenon.
6. Design the frame work of various electronic circuitries based on semiconducting materials.

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Course Title : Energy and Environment Engineering **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI1T/2T006 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Environment **L – T – P : 3 – 0– 0**

Stream :Theory subject **Credits : 3**

COURSE OBJECTIVES

1. To understand the importance of Energy and Environment
2. To understand the application of energy saving tool in real life.
3. To investigate the key concepts of Energy and Environment.

COURSE OUTCOMES

At the end of the course students will be able to

1) Describe different kind of pollution eg. Water pollution, air pollution, soil pollution etc.

2) Understand the importance of ecosystem for human beings..

3) Discover innovative method of power generation.

4) Correlate the cost of various method of power generation.

5) Judge the quality of air.

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Course Title : Introduction To Computer Programming **Semester : I**

Course Code : HU1T002 **Course Type : Compulsory**

Pr-requisite : Basic knowledge of Computer **L – T – P : 2 – 0– 0**

Stream :Theory subject **Credits : 2**

COURSE OBJECTIVES

1. To understand the importance of Programming
2. To understand the application of C Programming.
3. To investigate the key concepts of C Programming.
4. To enable students build a applications based on C programming

COURSE OUTCOMES

CO1: Define the algorithms, flowcharts, array , pointer, structure ,function , python.

CO2: Discuss and differentiate between variables , operators ,statements , loops, array dimensions.

CO3:Demonstrate working programs using functions, loops ,conditional statements ,array ,pointer, structure and
files in C and python language .

CO4:Distinguish between different steps of programming and prioritize levels of programming.

CO5:Find errors and predict outcome in C and python programming.

CO6:Compose and develop any application using C and python programming.

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Course Title : Introduction To Computer Programming (LAB) **Semester : I**

Course Code : HU1L002 **Course Type : Compulsory**

Pr-requisite : Basic knowledge of Computer **L – T – P : 0 – 0– 4**

Stream : Theory subject **Credits : 2**

COURSE OBJECTIVES

1. To introduce students to the basic knowledge of programming fundamentals of C language.
2. To impart writing skill of C programming to the students and solving problems.
3. To impart the concepts like looping, array, functions, pointers, file, structure

COURSE OUTCOME

After completing this lab course you will be able to:

1. Understand the logic for a given problem.
2. Write the algorithm of a given problem.
3. Draw a flow chart of a given problem.
4. Recognize and understand the syntax and construction of C programming code..
5. Make use of different data-structures like arrays, pointers, structures and files.
6. Know the alternative ways of providing solution to a given problem.

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Course Title : Workshop Practices **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS/AI 1L/2L001 **Course Type : Compulsory**

Pre-requisite : Basic Knowledge Of Workshop **L – T – P :0 – 0– 4**

Stream :Practical subject **Credits : 2**

Instructions to the student:

Each student is required to maintain a „workshop journal" consisting of drawing / sketches of the jobs and a brief description of tools, equipment, and procedure used for doing the job.

Contents:

a) **Carpentry:** Technical Terms related to wood working, Types of wood, Joining materials, Types of joints - Mortise and Tenon, Dovetail, Half Lap, etc., Methods of preparation and applications, Wood working lathe, safety precautions.

b) Welding: Arc welding - welding joints, edge preparation, welding tools and equipment, Gas welding - types of flames, tools and equipment, Resistance welding - Spot welding, joint preparation, tools and equipment, safety precautions.

c) Fitting: Fitting operation like chipping, filing, right angle, marking, drilling, tapping etc., Fitting hand tools like vices, cold chisel, etc. Drilling machine and its operation.

e) Machine shop: Lathe machine, types of lathes, major parts, cutting tool, turning operations (Demo), safety precautions

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Course Title : Introduction to A I & Its Application **Semester : I**

Course Code : AI1T008 **Course Type:Compulsory**

Pre-requisite : Basic knowledge of Mathematical Logic **L – T – P :2 – 0– 0**

Stream :Theory subject **Credits : Audit**

COURSE OBJECTIVES

1. To understand the importance of AI and use of AI tools
2. To understand the application of AI in engineering and in real life.
3. To investigate the key concepts of knowledge representation and different notations.
4. To enable students to analyze a problem so that appropriate problem solving techniques may be applied.

COURSE OUTCOMES

Upon successful completion of this course student will able :

1. To understand the basics of Artificial Intelligence , Intelligent Agents and its structure
2. To Apply various searching techniques of Problem solving
3. To Acquire theoretical knowledge about principles for logic-based representation and reasoning
4. To Participate in the design of systems that act intelligently and learn from experience
5. To Understand the relation between AI & various domains

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Course Title : Engineering Mathematics-II **Semester : II**

Course Code : MA2T001 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Mathematics **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Mathematics
2. To understand the application of Mathematics in engineering and in real life.
3. To investigate the key concepts of Mathematics.
4. To enable students to analyze a problem

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus.
2. Illustrate the concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus by using examples.
3. Apply the knowledge of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.
4. Analyze the problems and results of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.
5. Evaluate the problems by using complex numbers, integral calculus & multiple integrals, Fourier series &transform, vector differential calculus, vector integral calculus to solve the engineering problems.
6. Create the methods or model by using complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector differential calculus, vector integral calculus to solve the engineering problems.

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Course Title : Engineering Chemistry **Semester : I/ II**

Course Code : ME/CE/EE/ET/IT/CS/AI/1T/2T002 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Chemistry **L – T – P : 3 – 1– 0**

Stream :Core subject **Credits : 4**

COURSE OBJECTIVES

1. To understand the importance of Chemistry
2. To understand the application of Chemistry in engineering and in real life.
3. To investigate the key concepts of Chemistry knowledge
4. To enable students to analyze a Chemistry problem so that appropriate problem solving techniques may be applied.

COURSE OUTCOMES

At the end of the course students will be able to

1. Describe various properties of water, nano-materal, transition metal ions and their magnetic properties, Debye-Hückel theory, Quinonoid theory, various electrode, spectro-photometric techniques.
2. Illustrate the various types of water, carbon nanotubes, Molecular orbital theory, Transport number by Moving Boundary method, Ostwald's theory of acid-base indicator, various batteries, UV and NMR spectroscopy.
3. Analyze the question on water characteristics, electrochemistry and various types of instrumental titration, various unknown sample by UV and NMR spectroscopy .
4. Apply the Knowledge of zeolite process, Ion exchange process, Hot Lime –Soda process, acid base concept, spectroscopic techniques.
5. Develop a Modal on softening of water, standardization of acid and base by various instruments, doping on band structure, spectroscopic techniques.
6. Organize water as per quality, carbon nanotubes, electrodes, Energy level diagrams of diatomic molecules, various elements as per their spectroscopic techniques.

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Course Title : Engineering Chemistry Practical **Semester : II**

Course Code : ME/CE/EE/ET/IT/CS 1L/2L002 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Chemistry **L – T – P : 0 – 0– 2**

Stream :Theory subject **Credits : 1**

COURSE OBJECTIVES

Students will be able to

1. Students will explore new areas of research in both chemistry and allied fields of science and technology.
2. Students will understand safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.
3. Students will recognize common laboratory techniques including pH measurement, acid/base titrations, UV/Visible spectroscopy.

COURSE OUTCOMES

Students will be able to

1. Recall hardness of water, acid value, saponification number of oils.
2. Demonstrate an ability to make chemical measurements and understand the limits of precision in measurements.
3. Enhance the comprehensibility of the practical concepts and their application.
4. Apply the analytical techniques to the experimental data
5. Making judgments based on criteria and standards through checking and critiquing
6. Design and apply the practical knowledge of engineering chemistry in daily life

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Course Title : Engineering Graphics **Semester : I/II**

Course Code : ME/CE/EE/ET/IT/CS1T/2T003 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of Graphics **L – T – P : 1 – 0– 0**

Stream :Practical subject **Credits : 1**

COURSE OBJECTIVES

1. To understand the concepts like dimensioning, conventions and standards related to engineering graphics in order to become professionally efficient
2. To understand theory of projection and simple machine parts in first and third angle of projection systems.
3. To understand the key concepts CAD software.
4. To enable students to analyze a 2-dimensional & 3-dimensional problem.

COURSE OUTCOMES

1. Define various concepts like dimensioning, conventions and standards related to engineering graphics in order to become professionally efficient.
2. Interpret drawings of simple machine component in first and third angle of projection systems
3. Apply theory of projections in projection of lines, projection of planes and projection of solid.
4. Classify solid geometry in different positions.
5. Assess the two dimensional and three dimensional drawing in CAD software.
6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using CAD software

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Course Title : Engineering Graphics-Lab **Semester : II**

Course Code : ME/CE/EE/ET/IT/CS/2L003 **Course Type : Compulsory**

Pre-requisite : Basics of Graphics Lab **L – T – P : 0 – 0– 4**

Stream :Practical subject **Credits : 2**

COURSE OBJECTIVES:

The objective of the course is to enable students to

1. Provide basic foundation in CAD software.
2. Understand the fundamentals used to create and manipulate geometric models.
3. Get acquainted with the basic CAD software for to design geometric modeling.

COURSE OUTCOMES:

1. Define basic structure of CAD workstation, CAD commands, Memory types, input/output devices and display devices to become professionally efficient to operate CAD software.
2. Explain drawing of simple machine component in CAD software.
3. Acquire the knowledge of geometric modeling in CAD software.
4. Analyze the steps required in CAD software for 2-dimensional and 3-dimensional models.
5. Assess the two dimensional and three dimensional drawing in CAD software.
6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using CAD software.

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KATOL ROAD, NAGPUR
B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Communication Skills **Semester : I/II**

Course Code : HU1T/2T001 **Course Type : Compulsory**

Pre-requisite : Basic knowledge of English **L – T – P : 2 – 0– 0**

Stream :Theory subject **Credits : 2**

Course Objectives:

The main objective of the subject is to enhance the employability skills of engineering studentsas well as communication skills at work place.

The sub-objectives are:

1) To develop students' reading skills and pronunciation.
2) To develop technical communication skills through drafting, letter writing, and précis writing.
3) To develop literary skills through essay writing.
4) To develop public speaking skills of the students.

Course Outcomes:

At the end of the course students will be able to

1) to better reading comprehension, pronunciation, and functional English grammar.
2) to write letters and resumes
3) to organize their thoughts for effective presentation and writing.
4) to learn skills to present themselves well in an interview, and handle a Group Discussion

To expose the students to the ethics of English language by teaching grammar

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Education to Eternity

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Communication Skills-Lab **Semester : II**

Course Code : HU2L001 **Course Type : Compulsory**

Pre-requisite : Basics of English grammar **L – T – P : 0 – 0– 4**

Stream :Theory subject **Credits : 2**

COURSE OBJECTIVES:

1. Apply appropriate communication skills. Students are able to enhance their employability skills as well as communication skills at work place.

2. Demonstrate knowledge of communication theory and application. Students have better reading comprehension, pronunciation, and functional English grammar.

3.Practice critical thinking to develop innovative and well-founded perspectives related to the students' emphases.

4.Build and maintain healthy and effective relationships. Students are able to write letters and resumes.

5.Use technology to communicate effectively in various settings and contexts. Students are able to organize their thoughts for effective presentation and writing.

6.Demonstrate appropriate and professional ethical behavior. Students are able to learn skills to present themselves well in an interview, and handle a Group Discussion

COURSE OUTCOMES

Students will be able to

CO1.Remember Communication Skills by giving adequate exposure in reading, writing, listening and speaking.

CO2.Understand the communication process by identifying, explaining, and applying current communication theories as they relate to a variety of contexts.

CO3.Apply proficiency, both in spoken and written English.

CO4.Analysing the communication behaviours of others and themselves in a variety of scenario (e.g. interpersonal, intercultural, group, public and professional communication, and mass media).

CO5.Evaluate and organize their thoughts for effective presentation and writing.

CO6. Improve research, organizational, and critical thinking skills by finding and evaluating reference material and organizing and presenting effective messages adapted to specific situations.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Basics of Electrical and Electronics Engineering **Semester : I/II**
Course Code : ME/CE/EE/ET/IT/CS 2T007 **Course Type : Compulsory**
Pre-requisite : Basic knowledge of Electrical and Electronic **L – T – P : 2-0-0**
Stream : Theory Subject **Credits : 0 (Audit)**

COURSE OBJECTIVES

1. To provide a basic information and use of electrical and electronics components.
2. To understand and study the materials used for the preparation of electrical and electronics components.
3. To provide basic knowledge of operation and functionality of electrical and electronics components.

COURSE OUTCOMES:

1. Define fundamentals of electrical system and choose measuring instruments for measurement of electrical quantities & describe the concept PN junction diode and its characteristics.

2. Classify wiring system and compare energy resources for electrical energy generation & elaborate the transistor configuration in CE, CB & CC mode.

3. Plan and organize the utilization of energy resources of electrical system & apply transistor characteristics to construct Amplifier devices.

4. Compare different sources of electrical system & distinguish various logic gates and simplify the Boolean's equations.

5. Justify the utilization of various electrical and electronics components into electrical and electronics circuitries.

6. Construct various circuits using Resistors, capacitors, inductors, PN junction diode, Zener diode, transformers, transistors and logic gates.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title :	**Introduction to Drones**	**Semester :**	**II**
Course Code :	**AI2T009**	**Course Type :**	**Compulsory**
Pre-requisite :	**Nil**	**L – T – P :**	**2 – 0– 0**
Stream :	**Theory subject**	**Credits :**	**Audit**

Course Objectives

The main aim of this course is to understand the basics of Drones and its various applications. The course will also impart the knowledge of how to fly a drone by considering the rules and regulations to the specific country. Further the students will be introduced to the safety measures to be taken during flight.

Course Outcomes:

Student will be able to

CO1: To introduce the various types of frame design used for the UAV and to accommodate the electronics over the frame to fly UAV.

CO2: To make the students understand the basic working principal behind the electronic components used and its specification to build a drone from scratch.

CO3: To enable the students to identify and understand various functional modules of the controller using a preprogrammed controller used in the UAV.

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B.TECH. FIRST YEAR
SESSION:2020-21

Course Title : Basic Civil and Mechanical Engineering **Semester : I/II**
Course Code : ME/CE/EE/ET/IT/CS/1T004
Course Type : Compulsory
Pre-requisite : Basic knowledge of Graphics **L – T – P : 2 – 0– 0**
Stream : Theory subject (Audit) **Credits : 0**

COURSE OBJECTIVES :

1. To understand the basic stream of Mechanical Engineering and Civil Engineering.
2. To understand the concepts of product manufacturing, Energy engineering, design engineering, Automobile engineering, construction technique and civil surveying.
3. To have basic knowledge of Casting, Machining, Designing, Manufacturing, different materials for building construction and surveying.

COURSE OUTCOMES:

Students would be able to

1. Define basic stream of Mechanical & Civil Engineering.
2. Explain the concepts of product manufacturing, Energy engineering, design engineering, Automobile engineering, construction technique and civil surveying.
3. Apply Basic knowledge of Casting, Machining, Designing, Manufacturing & Civil Construction technique.
4. Analyzed the different mechanical system and properties of construction & surveying material.
5. Interpret the problem in mechanical system and civil structure.
6. Solve the problem in mechanical system and civil structure.

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Website: www.jdcoem.ac.in E-mail: info@jdcoem.ac.in
(An Autonomous Institute, with NAAC "A" Grade)
Affiliated to DBATU, RTMNU & MSBTE Mumbai
Department of Information Technology
"Progress Beyond Excellence"
2020-21

VISION	MISSION
To be recognized as a centre of excellence in the field of Information Technology where inquisitive minds of students are fostered, leading to skills professionals for satisfying the needs of society.	1. Apply knowledge of engineering fundamentals & cutting-edge technology to identify and implement innovative solutions for engineering problems and issue in society at large. 2. Build strong interpersonal skills and will engage in life long learning to enhance their career positions, both as team members and leaders.

COs of year 2022-23 Information Technology Department

Semester –III

1. **Organization Behavior** **IT3T001**

1. Outline the applicability of the concept of organizational behaviour to understand the behaviour of people in the organization.
2. Categorizing the applicability of analyzing the complexities associated with management of individual behaviour in the organization.
3. Analyze the complexities associated with management of the group behaviour in the organization
4. Validate how the organizational behaviour can integrate in understanding the motivation (why) behind behaviour of people in the organization

2. **Mathematics-III** **IT3T002**

1.Describe the concept of Laplace Transform, Fourier transform, complex variables, Numerical Linear Algebra, Stochastic calculus, Computational graph theory
2.Illustrate the concept of Laplace Transform, Fourier transform, complex variables, Numerical Linear Algebra, Stochastic calculus, Computational graph theory by using examples.
3.Apply the concept of Laplace Transform, Fourier transform, complex variables, Numerical Linear Algebra, Stochastic calculus, Computational graph theory to solve the problem.
4.Analyze the problem by using the concept of Laplace Transform, Fourier transform, complex variables, Numerical Linear Algebra, Stochastic calculus, Computational graph theory.
5.Evaluate the problem base on the concept of Laplace Transform, Fourier transform, complex variables, Numerical Linear Algebra, Stochastic calculus, Computational graph theory.

3. **Digital Electronics & Fundamentals of Microprocessor** **IT3T003**

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1. Define basic logical circuits, Boolean algebra, minimization methods, methods for writing Boolean functions, combinational and sequential circuits, flip-flops, digital automaton, and programmable structures.
2. Describe operation methods of combinational and sequential circuits, similarities and differences of writing the Boolean functions and minimizations.
3. Select appropriate methods for realization and circuit minimization.
4. Pattern recognition for specific circuit realization and error discovery during circuit design process.
5. Synthesis of appropriate combinational and sequential logic circuits.

4. Computer Arhcitecture & Organsization **IT3T004**

1. Outcome- Interpret the functional architecture of computing systems. (Understanding) Classify and compute the performance of machines.
2. Explain addressing modes, instruction formats and program control statements.
3. Relate to arithmetic for ALU implementation. Understand the basics of hardwired and micro-programmed control of the CPU.
4. Build large memories using small memories for better performance. Write ISA level code for RISC and CISC machines.
5. Identify, compare and assess issues related to ISA, memory, control and I/O functions. (Applying, Analyzing, Evaluating)

5. Data structure using OOPs **IT3T005**

1. Understand the concept of ADT.
2. Identify data structures suitable to solve problems.
3. Develop and analyze algorithms for stacks, queues.
4. Develop algorithms for binary trees and graphs.
5. Implement sorting and searching algorithms.

6. Computer Graphics **IT3T006**

1. Understand the scope of computer graphics and also identified the field related to computer Graphics
2. Demonstrate on the concepts on transforms including translation, rotation, scaling, shearing and reflection.
3. Design algorithms for different geometric shapes, lines , circle, ellipse.
4. Develop algorithms for binary trees and graphs.
5. Implement sorting and searching algorithms.

7. Data structure using OOPs(Lab) **IT3L007**

1. Ability to analyze algorithms and algorithm correctness.
2. Ability to summarize searching and sorting techniques.
3. Ability to describe stack, queue and linked list operation.
4. Ability to have knowledge of tree and graphs concepts.

8. Digital Electronics & Fundamentals of Microprocessor (Lab) **IT3L008**

1.Describe and explain the operation of fundamental digital gates.

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2.Analyze the operation of medium complexity standard combinational circuits like the encoder, decoder, multiplexer, de-multiplexer, and adder.
3.Analyze the operation of a flip-flop and examine relevant timing diagrams.
4.Learn importance of Microprocessors in designing real time applications.
5.Describe the 8085, 8086 & 80386 Microprocessors architectures and its feature.

9. Computer Graphics (Lab) IT3L009

1. To list the basic concepts used in computer graphics.
2. To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
3. To describe the importance of viewing and projections.
4. To understand a typical graphics pipeline.

10. Universal Human Values IT3T011

1. Apply effective written and oral communication skills to business and legal situations.
2. Analyze the global legal environment.
3. Students will graduate with the ability to analyze complex problems, find and deploy a variety of legal authorities, and communicate effectively in a variety of settings.
4. Use critical thinking skills in business situations.
5. Apply an ethical understanding and perspective to business situations.

Semester –IV

1. Theory of Computation IT4T001

1. Students shall able to define the mathematical principles behind theoretical computer science.
2. Students shall able to Differentiate and give examples for the different types of automata like finite automata, push down automata, linear bounded automata and turing machine.
3. Students shall able to correlate the different types of automata to real world applications.
4. Students shall able to Choose and design appropriate automata for the different requirements outlined by theoretical computer science.
5. Students shall able to identify the different computational problems and their associated complexity.

2. Java Programming IT4T002

1. Student shall be able to Understand and implement advanced Java concepts.
2. Student shall be able to Develop Java based Web applications using Servlets and JSP.
3. Student shall be able to incorporate cutting-edge frameworks in web application development

3. Operating System IT4T003

1. Identify the significance of operating system in computing devices.
2. Exemplify the communication between application programs and hardware devices through system calls.

3. Compare and illustrate various process scheduling algorithms.
4. Apply appropriate memory and file management schemes.
5. Illustrate various disk scheduling algorithms.

4. Computer Networks **IT4T004**

1. Discuss the physical and logical as well as the electrical characteristics of digital signals and the basic methods of data transmission.
2. Identify the importance of the ISO 7-layer reference model.
3. Identify and requirements hosted in communication protocols and give an overview of data communication standards, how these standards were developed and under which assumptions they were adopted.
4. Establish a solid knowledge of the layered approach that makes design, implementation, and operation of extensive networks possible.
5. Acquire the knowledge of the basic protocols involved in wired/wireless communication process.

5. DBMS **IT4T005**

1. Learn and understand fundamentals of database management system.
2. Exhibit the query development knowledge.
3. Learn modeling and normalization of databases.
4. Learn query processing and file organization.
5. Exhibit the knowledge of transaction and concurrency control

6. Discrete Mathematics & Graph Theory **IT4T006**

1.Be able to construct simple mathematical proofs and possess the ability to verify them ABET
2. Acquire ability to describe computer programs (e.g. recursive functions) in a formal mathematical manner
3. Be able to apply basic counting techniques to solve combinatorial problems

7. DBMS(Lab) **IT4L007**

1. Apply the basic concepts of Database Systems and Applications.
2. Use the basics of SQL and construct queries using SQL in database creation and interaction.
3. Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
4. Analyze and Select storage and recovery techniques of database system.

8. Computer Networks(Lab) **IT4L008**

1. Understand fundamental underlying principles of computer networking.
2. Understand details and functionality of layered network architecture.
3. Apply mathematical foundations to solve computational problems in computer networking.
4. Analyze performance of various communication protocols.
5. Compare routing algorithms.

9. Java Programming(Lab) **IT4L009**

1. Understand the structure and model of the Java programming language, (knowledge)

2. Use the Java programming language for various programming technologies (understanding).

3. Develop software in the Java programming language, (application).

4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis).

5. Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis).

10. Field Training

1. Participate in the projects in industries during his or her industrial training.

2.Describe use of advanced tools and techniques encountered during industrial training and visit.

3.Interact with industrial personnel and follow engineering practices and discipline prescribed in industry.

4.Develop awareness about general workplace behavior and build interpersonal and team skills.

5.Prepare professional work reports and presentations.

HOD IT

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KATOL ROAD, NAGPUR
Affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere
Website: www.jdcoem.ac.in E-mail: info@jdcoem.ac.in
An Autonomous Institute, with NAAC "A" Grade
Department of Mechanical Engineering

Education to Eternity

॥ज्ञानम् सर्वार्थ साधनम्॥

VISION	MISSION
To be a centre of excellence of learning and research in Mechanical Engineering."	1. To provide high quality, innovative and research environment in Mechanical Engineering. 2. To impart soft skills and hard skills to achieve the institutional vision

COURSE OUTCOME LIST 2021-22

Semester	Course Code	Course Name	CO Number	Course Outcome
1	HU1T001	Communication Skills	CO1	1) to better reading comprehension, pronunciation, and functional English grammar.
1	HU1T001	Communication Skills	CO2	2) to write letters and resumes
1	HU1T001	Communication Skills	CO3	3) to organize their thoughts for effective presentation and writing.
1	HU1T001	Communication Skills	CO4	4) to learn skills to present themselves well in an interview, and handle a Group Discussion
1	MA1T001	Engineering Mathematics- I	CO1	1. Describe rank, Bernoulli's theorem, Taylor's and Maclaurin's theorems for functions of two variables, – Euler's
1	MA1T001	Engineering Mathematics- I	CO2	2. Illustrate the examples of ordinary differential equation, partial differential equation, matrices.
1	MA1T001	Engineering Mathematics- I	CO3	3. Solve questions related to ordinary differential equation, partial differential equation, matrices and their
1	MA1T001	Engineering Mathematics- I	CO4	4. Apply the knowledge of matrices, ordinary differential equation, partial differential equation, and their
1	MA1T001	Engineering Mathematics- I	CO5	5. interpret the results of matrices, ordinary differential equation, partial differential equation and their
1	MA1T001	Engineering Mathematics- I	CO6	6. Design a method or modal on matrices, ordinary differential equation, partial differential equation.
1	ME1T002	Engineering Chemistry	CO1	1. Describe various properties of water, nano-materal, transition metal ions and their magnetic properties, Debye-
1	ME1T002	Engineering Chemistry	CO2	2. Illustrate the various types of water, carbon nanotubes, Molecular orbital theory, Transport number by Moving
1	ME1T002	Engineering Chemistry	CO3	3. Analyze the question on water characteristics, electrochemistry and various types of instrumental titration,
1	ME1T002	Engineering Chemistry	CO4	4. Apply the Knowledge of zeolite process, Ion exchange process, Hot Lime –Soda process, acid base concept,
1	ME1T002	Engineering Chemistry	CO5	5. Develop a Modal on softening of water, standardization of acid and base by various instruments, doping on
1	ME1T002	Engineering Chemistry	CO6	6. Organize water as per quality, carbon nanotubes, electrodes, Energy level diagrams of diatomic molecules,
1	ME1T003	Engineering Graphics	CO1	1. Define various concepts like dimensioning, conventions and standards related to engineering graphics
1	ME1T003	Engineering Graphics	CO2	2. Interpret drawings of simple machine component in first and third angle of projection systems
1	ME1T003	Engineering Graphics	CO3	3. Apply theory of projections in projection of lines, projection of planes and projection of solid.
1	ME1T003	Engineering Graphics	CO4	4. Classify solid geometry in different positions.
1	ME1T003	Engineering Graphics	CO5	5. Assess the two dimensional and three dimensional drawing in CAD software.
1	ME1T003	Engineering Graphics	CO6	6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using CAD
1	HU1L001	Communication Skills Lab.	CO1	CO1.Remember Communication Skills by giving adequate exposure in reading, writing,
1	HU1L001	Communication Skills Lab.	CO2	CO2.Understand the communication process by identifying, explaining, and applying current communication
1	HU1L001	Communication Skills Lab.	CO3	CO3.Apply proficiency, both in spoken and written English.
1	HU1L001	Communication Skills Lab.	CO4	CO4.Analysing the communication behaviours of others and themselves in a variety of scenario (e.g. interpersonal,
1	HU1L001	Communication Skills Lab.	CO5	CO5.Evaluate and organize their thoughts for effective presentation and writing.
1	HU1L001	Communication Skills Lab.	CO6	CO6. Improve research, organizational, and critical thinking skills by finding and evaluating reference material and
1	ME1L002	Engineering Chemistry Lab	CO1	1. Recall hardness of water, acid value, saponification number of oils.

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Semester	Course Code	Course Name	CO Number	Course Outcome
1	ME1L002	Engineering Chemistry Lab	CO2	2. Demonstrate an ability to make chemical measurements and understand the limits of precision in
1	ME1L002	Engineering Chemistry Lab	CO3	3. Enhance the comprehensibility of the practical concepts and their application.
1	ME1L002	Engineering Chemistry Lab	CO4	4. Apply the analytical techniques to the experimental data
1	ME1L002	Engineering Chemistry Lab	CO5	5. Making judgments based on criteria and standards through checking and critiquing
1	ME1L002	Engineering Chemistry Lab	CO6	6. Design and apply the practical knowledge of engineering chemistry in daily life
1	ME1L003	Engineering Graphics Lab	CO1	1. Define basic structure of CAD workstation, CAD commands, Memory types, input/output devices and display
1	ME1L003	Engineering Graphics Lab	CO2	2. Explain drawing of simple machine component in CAD software.
1	ME1L003	Engineering Graphics Lab	CO3	3. Acquire the knowledge of geometric modeling in CAD software.
1	ME1L003	Engineering Graphics Lab	CO4	4. Analyze the steps required in CAD software for 2-dimensional and 3-dimensional models.
1	ME1L003	Engineering Graphics Lab	CO5	5. Assess the two dimensional and three dimensional drawing in CAD software.
1	ME1L003	Engineering Graphics Lab	CO6	6. Create the three dimensional engineering objects into two dimensional drawings and vice versa using CAD
1	ME1T004	Basic Civil and Mechanical Engineering	CO1	1. Define basic stream of Mechanical & Civil Engineering.
1	ME1T004	Basic Civil and Mechanical Engineering	CO2	2. Explain the concepts of product manufacturing, Energy engineering, design engineering, Automobile
1	ME1T004	Basic Civil and Mechanical Engineering	CO3	3. Apply Basic knowledge of Casting, Machining, Designing, Manufacturing & Civil Construction technique.
1	ME1T004	Basic Civil and Mechanical Engineering	CO4	4. Analyzed the different mechanical system and properties of construction & surveying material.
1	ME1T004	Basic Civil and Mechanical Engineering	CO5	5. Interpret the problem in mechanical system and civil structure.
1	ME1T004	Basic Civil and Mechanical Engineering	CO6	6. Solve the problem in mechanical system and civil structure.
2	HU2T002	Introduction to Computer programming	CO1	CO1: Define the algorithms, flowcharts, array , pointer, structure ,function , python.
2	HU2T002	Introduction to Computer programming	CO2	CO2: Discuss and differentiate between variables , operators ,statements , loops, array dimensions.
2	HU2T002	Introduction to Computer programming	CO3	CO3:Demonstrate working programs using functions, loops ,conditional statements ,array ,pointer, structure and
2	HU2T002	Introduction to Computer programming	CO4	CO4:Distinguish between different steps of programming and prioritize levels of programming.
2	HU2T002	Introduction to Computer programming	CO5	CO5:Find errors and predict outcome in C and python programming.
2	HU2T002	Introduction to Computer programming	CO6	CO6:Compose and develop any application using C and python programming.
2	MA2T001	Engineering Mathematics- II	CO1	1. Describe concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform, vector
2	MA2T001	Engineering Mathematics- II	CO2	2. Illustrate the concept of complex numbers, integral calculus & multiple integrals, Fourier series & transform,
2	MA2T001	Engineering Mathematics- II	CO3	3. Apply the knowledge of complex numbers, integral calculus & multiple integrals, Fourier series & transform,
2	MA2T001	Engineering Mathematics- II	CO4	4. Analyze the problems and results of complex numbers, integral calculus & multiple integrals, Fourier series &
2	MA2T001	Engineering Mathematics- II	CO5	5. Evaluate the problems by using complex numbers, integral calculus & multiple integrals, Fourier series
2	MA2T001	Engineering Mathematics- II	CO6	6. Create the methods or model by using complex numbers, integral calculus & multiple integrals, Fourier series &
2	ME2T005	Engineering Physics	CO1	1.Acquire fundamental understanding of concepts specifically concern to semiconducting materials, Optics, Fibre
2	ME2T005	Engineering Physics	CO2	2.Develop the ability to recognize the appropriate physics that applies to experiments based on the Engineering
2	ME2T005	Engineering Physics	CO3	3.To develop a systematic, logical approach to problem – solving that can be applied to problems in physics and to
2	ME2T006	Energy and Environment Engineering	CO1	1) Describe different kind of pollution eg. Water pollution, air pollution, soil pollution etc.
2	ME2T006	Energy and Environment Engineering	CO2	2) Understand the importance of ecosystem for human beings..
2	ME2T006	Energy and Environment Engineering	CO3	3) Discover innovative method of power generation.
2	ME2T006	Energy and Environment Engineering	CO4	4) Correlate the cost of various method of power generation.
2	ME2T006	Energy and Environment Engineering	CO5	5) Judge the quality of air.
2	HU2L002	Introduction to Computer programming Lab	CO1	1. Understand the logic for a given problem.
2	HU2L002	Introduction to Computer programming Lab	CO2	2. Write the algorithm of a given problem.
2	HU2L002	Introduction to Computer programming Lab	CO3	3. Draw a flow chart of a given problem.
2	HU2L002	Introduction to Computer programming Lab	CO4	4. Recognize and understand the syntax and construction of C programming code..
2	HU2L002	Introduction to Computer programming Lab	CO5	5. Make use of different data-structures like arrays, pointers, structures and files.
2	HU2L002	Introduction to Computer programming Lab	CO6	6. Know the alternative ways of providing solution to a given problem.
2	ME2L005	Engineering Physics Lab	CO1	1. Visualize and understand the concepts of various phenomenon of light, principle of LASER, Optical fiber and
2	ME2L005	Engineering Physics Lab	CO2	2. Understand the working principles of Semiconducting devices and their application.

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Semester	Course Code	Course Name	CO Number	Course Outcome
2	ME2L005	Engineering Physics Lab	CO3	3. Apply the theoretical concepts to demonstrate the ability to measure properties of a variety of electrical and
2	ME2L005	Engineering Physics Lab	CO4	4. Analyze the different crystal structure with the help of crystal models.
2	ME2L005	Engineering Physics Lab	CO5	5. Construct the various devices based on optical phenomenon.
2	ME2L005	Engineering Physics Lab	CO6	6. Design the frame work of various electronic circuitries based on semiconducting materials.
2	ME2T007	Basic Electrical and Electronics Engineering	CO1	1. Define fundamentals of electrical system and choose measuring instruments for measurement of electrical
2	ME2T007	Basic Electrical and Electronics Engineering	CO2	2. Classify wiring system and compare energy resources for electrical energy generation & elaborate the transistor
2	ME2T007	Basic Electrical and Electronics Engineering	CO3	3. Plan and organize the utilization of energy resources of electrical system & apply transistor characteristics to
2	ME2T007	Basic Electrical and Electronics Engineering	CO4	4. Compare different sources of electrical system & distinguish various logic gates and simplify the Boolean's
2	ME2T007	Basic Electrical and Electronics Engineering	CO5	5. Justify the utilization of various electrical and electronics components into electrical and electronics circuitries.
2	ME2T007	Basic Electrical and Electronics Engineering	CO6	6. Construct various circuits using Resistors, capacitors, inductors, PN junction diode, Zener diode, transformers,
3	ME3T001	Applied Maths-III	CO1	1. Describe Matrices, properties of Laplace transform and Z Transform, partial differential equation, Function of
3	ME3T001	Applied Maths-III	CO2	2. Illustrate the examples using Matrices, Laplace and Z Transform, Partial differential equation, Function of
3	ME3T001	Applied Maths-III	CO3	3. Apply the knowledge of Matrices, Laplace transform, Z Transform, Partial differential equation, Function of
3	ME3T001	Applied Maths-III	CO4	4. Analyze the question on Matrices, Laplace transform ,Z Transform, Partial differential equation , Function of
3	ME3T001	Applied Maths-III	CO5	5. Synthesize the knowledge of Matrices, Laplace transform, Z Transform, Partial differential equation, Function of
3	ME3T002	Rigid Body Mechanics	CO1	1. Define static, dynamic, kinematic and kinetic bodies, law of transmissibility, Varignon's theorem, Lami's
3	ME3T002	Rigid Body Mechanics	CO2	2. Interpret conditions of body based on rest or in motion, the system of forces like concurrent or non-
3	ME3T002	Rigid Body Mechanics	CO3	3. Apply knowledge, facts and techniques in the applications like beams, frames, trusses, spheres, composite
3	ME3T002	Rigid Body Mechanics	CO4	4. Examine the given problems using concepts such as free body diagrams and force analysis methods in
3	ME3T002	Rigid Body Mechanics	CO5	5. Present opinions on conservative as well as non-conservative forces systems and validate simple general rigid
3	ME3T002	Rigid Body Mechanics	CO6	6. Propose alternative solutions on various applications of rigid body as well as create equations based on the
3	ME3T003	Material Science	CO1	1. Define various structure of materials, their properties, testing methodologies, equilibrium diagrams, heat
3	ME3T003	Material Science	CO2	2. Classify the various materials on the basis of characterization and behavior, heat treatment process with
3	ME3T003	Material Science	CO3	3. Demonstration of the various phase transformation equilibrium diagrams, destructive and nondestructive
3	ME3T003	Material Science	CO4	4. Analyze heat treatment process for required mechanical properties.
3	ME3T003	Material Science	CO5	5. Evaluate samples of different materials for metallography.
3	ME3T003	Material Science	CO6	6. Estimate mechanical properties, phase diagrams and metallographic samples.
3	ME3T004	Engineering Thermodynamics	CO1	1. Define the four basic laws viz. zeroth law, first law, second law and third law of thermodynamics and
3	ME3T004	Engineering Thermodynamics	CO2	2. Illustrate basic concepts, properties of substances and Laws of thermodynamics.
3	ME3T004	Engineering Thermodynamics	CO3	3. Apply the Laws of Thermodynamics for various thermodynamic processes / cycles.
3	ME3T004	Engineering Thermodynamics	CO4	4. Categorize different thermodynamic processes for heat and work transfer.
3	ME3T004	Engineering Thermodynamics	CO5	5. Evaluate knowledge of thermodynamics to suggest solutions for problems.
3	ME3T004	Engineering Thermodynamics	CO6	6. Design the system using basic laws of thermodynamic.
3	ME3T005	Theory Of Machines-I	CO1	1. Define various types of mechanisms, velocity and acceleration images, cam and follower, Laws of friction,
3	ME3T005	Theory Of Machines-I	CO2	2. Explain the concepts of simple mechanism, velocity and acceleration images, types of cam and follower,
3	ME3T005	Theory Of Machines-I	CO3	3. Compute the degree of freedom,velocity and acceleration in simple mechanisms and cam and follower,
3	ME3T005	Theory Of Machines-I	CO4	4. Analyze various mechanisms, cams and follower, clutches and brakes,gears and gear trains.
3	ME3T005	Theory Of Machines-I	CO5	5. Design the various mechanisms,cam and follower, clutches and breaks,gears and gear trains for specific
3	ME3T006	Manufacturing Engineering-I	CO1	1. Identify different castings, forming, joining & plastic processing also it's working principles and applications.
3	ME3T006	Manufacturing Engineering-I	CO2	2. Classify & describe different castings, forming, joining & plastic processing. Compute the degree of freedom,
3	ME3T006	Manufacturing Engineering-I	CO3	3. Demonstrate working principles and applications of castings, forming, welding & plastic processing including
3	ME3T006	Manufacturing Engineering-I	CO4	4. Categorize different operation performed in castings, forming, joining & plastic processing.
3	ME3T006	Manufacturing Engineering-I	CO5	5. Create different job using different operation performed in castings, forming, joining & plastic processing.
3	ME3L003	Material Science Lab	CO1	1. Categorize the ferrous alloy, nonferrous alloy, heat treatment process, destructive testing, nondestructive
3	ME3L003	Material Science Lab	CO2	2. Justify the experimentation on the metallurgical microscope, heat treatment furnace and devices used for

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Semester	Course Code	Course Name	CO Number	Course Outcome
3	ME3L003	Material Science Lab	CO3	3. Apply the experimental procedures for microstructure examinations, specimen preparation and heat
3	ME3L003	Material Science Lab	CO4	4. Analyze the microstructure of samples and heat treatment of steel samples.
3	ME3L006	Manufacturing Engineering-I Lab	CO1	1. Make use of various manufacturing process for preparation of pattern, moulding, casting, forming, joining.
3	ME3L006	Manufacturing Engineering-I Lab	CO2	2. Categorize the various manufacturing process as per application of industry.
3	ME3L006	Manufacturing Engineering-I Lab	CO3	3. Justify the various operations of casting, forming, joining.
3	ME3L007	Machine Drawing and Computer Graphics	CO1	1. Define sectional views, limits, fits, tolerances, machine component& symbols along with proper application
3	ME3L007	Machine Drawing and Computer Graphics	CO2	2. Illustrate sectional views, limits, fits, tolerances, symbols, machine component & assemblies for appropriate
3	ME3L007	Machine Drawing and Computer Graphics	CO3	3. Construct different sectional views, machine element, and assemblies.
3	ME3L007	Machine Drawing and Computer Graphics	CO4	4. Classify different sectional views, machine elements & assemblies.
4	ME4T001	Numerical Method	CO1	1. Describe the concept error analysis, algebraic equation, root of equation, ODE, numerical integration,
4	ME4T001	Numerical Method	CO2	2. Illustrate the concept of various Numerical Techniques Bisection methods, Newton Raphson method, Gauss-
4	ME4T001	Numerical Method	CO3	3. Solve the given Engineering problem using the suitable Numerical Technique Bisection methods, Newton
4	ME4T001	Numerical Method	CO4	4. Analyze the question on algebraic equation, root of equation, ODE, numerical integration, Interpolation, Curve
4	ME4T001	Numerical Method	CO5	5. Develop the computer programming based on the Numerical Technique of algebraic equation, root of equation,
4	ME4T002	Basic Electronic Engineering	CO1	1. Define semiconductor, Energy band diagram, diffusion component diode, DC circuit, BJT & FET amplifier.
4	ME4T002	Basic Electronic Engineering	CO2	2. Illustrate semiconductor material, energy band diagram, DC circuit, BJT & FET amplifier, Bipolar transistor &
4	ME4T002	Basic Electronic Engineering	CO3	3. Develop energy band diagram, diffusion current circuit, Bipolar transistor amplifier circuit using BJT & FET.
4	ME4T002	Basic Electronic Engineering	CO4	4. Analyse semiconductor material, diffusion current component, electronic circuit, BJT & FET amplifier circuit.
4	ME4T002	Basic Electronic Engineering	CO5	5. Interpret electronic circuit, simple amplifier circuit.

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Semester	Course Code	Course Name	CO Number	Course Outcome
4	ME4T002	Basic Electronic Engineering	CO6	6. Design electronic circuit & amplifier circuit using BJT & FET.
4	ME4T003	Product Design and Development	CO1	1. Select phases of product design, Idea Creation, Sketching of product and different commands for 2D and 3D.
4	ME4T003	Product Design and Development	CO2	2. Demonstrate sketching of the component, fitting of the component and interpret the manufacturing process of
4	ME4T003	Product Design and Development	CO3	3. Identify reverse engineering concept and organize product specification data sheet for mechanical design.
4	ME4T003	Product Design and Development	CO4	4. Analyze the wok to meet design requirements.
4	ME4T004	Manufacturing Engineering-II	CO1	1. Identify different machine tool and it's working principles and applications.
4	ME4T004	Manufacturing Engineering-II	CO2	2. Classify & describe different machine tool & it's processes..
4	ME4T004	Manufacturing Engineering-II	CO3	3. Demonstrate working principles and applications of different machine tools & advanced joining Processes
4	ME4T004	Manufacturing Engineering-II	CO4	4. Categorize different operation performed on different machine tool.
4	ME4T004	Manufacturing Engineering-II	CO5	5. Create different job using different operation performed different machine tool.
4	ME4T004	Manufacturing Engineering-II	CO6	6. Able to outline the various systems used in a manufacturing plant and their role in an Industry 4.0 world.
4	ME4T005	Strength Of Materials	CO1	1. Define the basic definitions of axial load, eccentric load, different types of stresses and strain in different
4	ME4T005	Strength Of Materials	CO2	2. Explain the stress state (tension, compression, bending, shear, etc.) and calculate the value of stress developed
4	ME4T005	Strength Of Materials	CO3	3. Solve problems on uniaxial, multiaxial stress situation, principal stresses, stresses on oblique plane, shear force-
4	ME4T005	Strength Of Materials	CO4	4. Analyse given beam for calculations of SF and BM, slope and deflection at a point on cantilever, simply
4	ME4T005	Strength Of Materials	CO5	5. Evaluate materials, sizes and sections for various applications such as beams, shafts, pressure vessels, columns,
4	ME4T005	Strength Of Materials	CO6	6. Design basic elements of structures like beams, shafts, key etc.
4	ME4T006	Fluid Mechanics & Fluid Machines	CO1	1. Define terms like viscosity, vapor pressure, compressibility, surface tension, capillarity, meta-centre and meta-
4	ME4T006	Fluid Mechanics & Fluid Machines	CO2	2. Classify various types of fluid, fluid flow, energy losses, water turbines and pumps
4	ME4T006	Fluid Mechanics & Fluid Machines	CO3	3. Apply Pascal's law, Hydrostatic law, Bernoulli's theorem and Dimensional analysis
4	ME4T006	Fluid Mechanics & Fluid Machines	CO4	4. Analyse the hydrostatic force acting on various plane, meta-centric height of ship model, velocity & acceleration
4	ME4T006	Fluid Mechanics & Fluid Machines	CO5	5. Evaluate the performance of various turbo machines such as pelton wheel turbine, kaplan turbine, Francis
4	ME4T006	Fluid Mechanics & Fluid Machines	CO6	6. Design simple hydraulic systems using the basic principles of fluid mechanics and turbo machinery
4	ME4L004	Manufacturing Engineering Lab	CO1	1. Make use of various machining process for preparation of job.

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Semester	Course Code	Course Name	CO Number	Course Outcome
4	ME4L004	Manufacturing Engineering Lab	CO2	2. Categorize the various machining process as per application of industry.
4	ME4L004	Manufacturing Engineering Lab	CO3	3. Justify the various operations of machining process.
4	ME4L005	Strength Of Materials Lab	CO1	1. Experiment with tension, compression, shear, torsion and impact test for different materials.
4	ME4L005	Strength Of Materials Lab	CO2	2. Analyze the stress and strain relationship under different loading conditions for various metals such as mild
4	ME4L005	Strength Of Materials Lab	CO3	3. Examine the experimental procedure to measure material properties used in industry and construction purpose.
4	ME4L005	Strength Of Materials Lab	CO4	4. Develop appropriate method for testing of the material as per the application
4	ME4L006	Fluid Mechanics & Fluid Machines Lab	CO1	1. Experiment with metacentre, meta-centric height, head loss, Impulse Momentum Principle, Bernoulli's
4	ME4L006	Fluid Mechanics & Fluid Machines Lab	CO2	2. Analysis of venturi-meter, orifice meter, water turbines and hydraulic pumps.
4	ME4L006	Fluid Mechanics & Fluid Machines Lab	CO3	3. Evaluate performance parameters of various hydraulic turbines and hydraulic pumps.
4	ME4T008	Innovation and Entrepreneurship Developm	CO1	1. Identify and validate of ideas.
4	ME4T008	Innovation and Entrepreneurship Developm	CO2	2. Remember Patent registration of Innovation.
4	ME4T008	Innovation and Entrepreneurship Developm	CO3	3. Understand roles and responsibilities of Entrepreneurship.

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VISION	MISSION
To be a center of excellence imparting professional education satisfying societal and global needs.	1. Transforming students into lifelong learners through, quality teaching, training and exposure to concurrent technologies. 2. Fostering conducive atmosphere for research and development through well-equipped laboratories and qualified personnel in collaboration with global organizations.

MBA 2020-21
Name of Courses according to Semester & their Co's

Semester	Name of Course	Co	
Ist	MANAGERIAL ECONOMICS	**CO1**	Given the details regarding price and quantity, the future manager will be able to **calculate** and **interpret** price elasticity, income elasticity and cross-price elasticity of demand and will also be able **examine** the uses and abuses of demand forecasting techniques
		CO2	Given the information about scale of production, the future manager will be able to **analyze** various aspects of empirical production functions and also will be able to **comprehend** the difference sources of economies and diseconomies of scale.
		CO3	Given the information pertaining to market structure, the future manager will be able to **determine** the optimal price and output for firms under different market structures.
		CO4	Given the circular flow model of an economy, the future manager will be able to interpret the role and importance of each component with regard to factor market and product market and will also be able to **comment** on the implications and control of inflation.
		CO5	Given the information regarding expenses and income in an economy, the future manager will be able to **calculate** and **explicate** the gross domestic product using expenditure and income approaches and given the details about a phase of the business cycle, the future manager will be able to **depict** the symptoms, causes and effects on economic activities of a nation
Ist	MANAGEMENT INFORMATION SYSTEMS	**CO1**	The student will be able to **describe** different types of management information system from management activity point of view and will also be able to **identify** and **work out** KRAs, BOPs and BPPs for various organisations/systems.
		CO2	The student will be able to **identify** the master data, **draw** report format and interface matrix while making a **model** of DSS.
		CO3	The student will be able to **suggest** the conceptual model of PMS and will also be able to **draw** a system model of integrated system (PMS+SCM+Accounting and Billing)
		CO4	The student will be able to **describe** the key features of ERP, SCM and CRM and will also be able to **draw** functional flow and process flow diagrams for various transactions.
		CO5	The student will be able to **enumerate** the factors affecting system performance and will also be able to **comment** on the operational feasibility of IT system under consideration
	BUSINESS RESEARCH	**CO1**	In context of research, the student will be able to **define** business research problems and will also able to formulate an abbreviated version of research proposal.

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		CO2	The student will be able to **describe** and **choose** appropriate sampling design and will also be able to **estimate** appropriate sample size.
		CO3	The student will be able to develop measurement tools and construct appropriate scales therein.
		CO4	The student will be able to **select** suitable method of data collection and will be able to **make** questionnaire/e-questionnaire
		CO5	The student will be able to **derive** inferences by applying various techniques of interpretation and be and write various types of research reports.
Ist	ORGANIZATIONAL BEHAVIOUR	**CO1**	Students will be able to **explain** the concept of Organisation Design and **determine** the factors that affect Organisation Design.
		CO2	Students will be able to **identify** the components of Individual Behaviour and **apply** the concept of Learning, Perception, Attitudes and values.
		CO3	The student will be able to **distinguish** between the various theories of motivation and their application in organizations and also be able to **apply** these theories to practical problems in organizations. They will also be able to **distinguish** between a number of different leadership theories & styles and contribute to the effective performance of a team as the team leader or a group member.
		CO4	The future managers/ students will be able to **analyse** the behaviour of individuals and groups in organisations in terms of the key factors that influence organisational behaviour and demonstrate skills required for working in groups (team building).
		CO5	The students will be able to **justify** how organizational change and conflict affect working relationships within organizations and **demonstrate** how to apply relevant theories to solve problems of change and conflict within organizations
Ist	FINANCIAL REPORTING, STATEMENTS AND ANALYSIS	**CO1**	Given an accounting situation Students will be able to **evaluate** selected accounting standards and **perform**their application in actual practice
		CO2	Given the Trial Balance and accompanying financial adjustments the future manager shall be able to ***prepare*** the financial statements and ***calculate*** the profit or loss of a firm as at the end of the financial year.
		CO3	Given the financial statements a student will be able to ***Prepare*** Cash Flow statement to ***evaluate*** whether a firm is doing well financially and has sufficient cash to meet its obligations and support its growth or not.

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		CO4	Given the financial statements a student will be able to ***perform*** Ratio analysis and comment on the performance of the firm. Whether a firm is doing well or not. (As compared to its peers or year on year basis.)
		CO5	Given the financial statements a student will be able to **formulate** common size statement, trend analysis as well as inter-firm and intra firm comparison (As compared to its peers or year on year basis.)
	BUSINESS STATISTICS AND ANALYTICS FOR DECISION MAKING	**CO1**	For a given dataset, the student should be able **estimate** the dispersion / variance & symmetry of the data using various measures and **draw** inferences to facilitate decision making.
		CO2	For a given dataset, the student should be able **assess** the level of association between given variables in the data using various types of correlation analysis techniques. The students should also be able to **predict** the values of a variable using regression analysis techniques.
		CO3	For given situations a student should be able **determine** the various probabilities arising out of the situation and **make use of** probability theory and appropriate probability distributions for the purpose of decision making.
		CO4	For a given research problem, student should be able to **construct** appropriate hypotheses and **draw** conclusions by using a suitable hypothesis testing procedure so as to **address** the research problem in question.
		CO5	The student will be able to **differentiate** between various forms of analytics and will also be able to **choose** suitable analytics for decision making.
Ist	LEGAL AND BUSINESS ENVIRONMENT	**CO1**	Given the circumstances, the learner will be able to **infer** legal aspects of doing business &**plan** business activities. In a given situation, the learner will be able **make use of** provisions of the Contract Act to **evaluate** a contract used in commercial practice.
		CO2	In a given situation, learner will be able to **distinguish** between various types of Companies and **explain** their comparative advantages and disadvantages. The learner will be able to **explain** the legal process involved in formation of a company and **understand** the relationships amongst the various stakeholders of the company.
		CO3	In context of Intellectual Property Rights (IPR) the learner will **understand** various components of IPR and **differentiate** between them. The learner can also **identify** the uses of IPR in business
		CO4	Under the given scenario, the learner will be able to describe various provisions of IT Act and will be able to use various provisions of Consumer Protection Act.

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		CO5	A learner will be able to analyze the elements of Social, political, economic environment around a firm.
	MANAGERIAL SKILLS FOR EFFECTIVENESS	**CO1**	The student will be able to **make proper use** of group of words, synonyms and antonyms, phrases, idioms, proverbs for effective verbal communication
		CO2	The student will be able to **write** essays and CV using Word Processor
		CO3	The student will be able to **draft** business letters for given situations using Word Processor
		CO4	The student will be able to **apply** basic functions of PowerPoint and will also be able to **create** effective PowerPoint Presentations using templates
		CO5	The student will be able to **use** various spreadsheet functions and will also be **create** useful spreadsheets
IInd	FINANCIAL MANAGEMENT	**CO1**	Given financial cost parameters, the future manager will be able to **calculate** specific cost of capital (i.e. Cost of debt, preference, equity and retained earnings) and the weighted average cost of capital for any specific given firm.
		CO2	Given different financing options, the future manager will be able to analyze the effect of operating and financial leverage on EPS and **recommend** a suitable long term financing mix for an organization by **applying** EBIT-EPS analysis, Indifference Level of EBIT and Financial Break-even Analysis for given financing options.
		CO3	Given the cash-flows pertaining to a project, the future manager will be able to **estimate** projects' cash flows to **distinguish** between value creating and value destroying investments using time-value intensive DCF techniques (viz. NPV, IRR, discounted payback period, profitability index) and Non-DCF techniques (i.e. Payback Period and Average rate of return approach)
		CO4	Given the details pertaining to elements of working capital for a given level of activity, the future manager will be able to **ascertain** the components of current assets and current liabilities and **determine** the gross and net operating working capital requirement.
		CO5	Given the expected dividends, future price of shares, investor expectations and funding requirements; the future manager will be able to **compute** the value of a share using various dividend discount models and **illustrate** whether dividend is relevant for firm valuation or not.
IInd	MARKETING MANAGEMENT	**CO1**	For a given marketing objective of a company the student manager will be able **to develop** a suitable marketing mix.

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		CO2	For a given product the student managers will be able **toapply** the three steps of target marketing: market segmentation, target marketing, and market positioning.
		CO3	For various stages in the life cycle of the product the student managers will be able **to recommend** a suitable pricing strategy.
		CO4	For a given company the student managers will be able **to evaluate** different distribution channel options and their suitability for the company's product.
		CO5	For a given promotional objective of a company the student manager should be able **to develop** a suitable promotion mix (advertising, sales promotion, public relations, personal selling, and direct marketing etc.) for the product.
IInd	HUMAN RESOURCE MANAGEMENT	**CO1**	Students should be able to **explain** the importance of Human Resource Management for an organisation and also distinguish between Personnel and HR Management.
		CO2	For a given job profile, students should be able to **develop** a job analysis and produce a job description and job specification.
		CO3	Students should be able to **design** a Human Resource Plan for an organisation and **construct** its Selection Process
		CO4	Students should be able to **justify** the applicability of various techniques of Training
		CO5	Students should be able to **outline** the performance appraisal process and **identify** and **explain** the utility of various modern and traditional methods of Performance Appraisal.
IInd	OPERATIONS MANAGEMENT	**CO1**	At the end of the course the students can **apply** the concept of operations management in manufacturing and service sector and will be able to **plan** and **implement** production and service related decisions.
		CO2	At the end of the course the student will be able to **plan** production schedules and plan resources (material and machine) required for production
		CO3	At the end of the course the students can **design** maintenance schedules in manufacturing units, **identify** and **propose** material handling equipments and implement industrial safety rules
		CO4	At the end of the course the students will be able to **apply** the concepts of purchase, stores and inventory management and **analyze** and **evaluate** material requirement decisions
		CO5	At the end of the course the students can **measure** performance related to productivity and will be able to **conduct** basic industrial engineering study on men and machines.
IInd	INTERNATIONAL BUSINESS	**CO1**	Students should be able to **understand** various concepts and terminologies involved in International Business and importance of international trade

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		CO2	Students should be able to **evaluate** various modes of entry in to International business and should be able to **select** the best mode of entry given a situation.
		CO3	Students should be able to **relate and discuss** the presence of macro factors (PESTEL) on international business environment
		CO4	Students should be able to **examine** and **elaborate** the role of various Government institutions in India which support International trade.
		CO5	Students should be able to **perceive** the concepts in recent EXIM policy of India and **relate it** to the flow of FDI as well as direction of Indian foreign trade.
IInd	CORPORATE SOCIAL RESPONSIBILITY AND SUSTAINABILITY	**CO1**	Given the concept of CSR, the future manager will be able to **identify** the various activities which can benefit the organization under the banner of CSR.
		CO2	Given a chance, the future manager will be able to **frame** and **recommend** the CSR policy according to sustainable development.
		CO3	Given the framework, the future manager will be able to **plan** the CSR activity according to the various laws and regulations.
		CO4	Given the details pertaining to government and non government organizations, the future manager will be able to **ascertain** the role of various stakeholders in CSR activities and **incorporate** the guidelines issued by regulatory guidelines in CSR policy.
		CO5	Given the task of CSR , the future manager will be able to **plan and implement** various activities to be taken under CSR activity and evaluate its effectiveness.
IInd	COST ACCOUNTING	**CO1**	Given an information about basic conceptual framework of cost, the student will be able of **identify**/ **classify** different elements/ classification of cost and will be able to **prepare** cost sheet and prepare quotations for various business proposals
		CO2	Given an information about cost, volume and profit for specific product for mention time period, a student will able to **compute** Break-even point, Marine of safety, Profit volume ratio, desired profit / desired sales as well as able to **evaluate** the decision making proposals(suitable product mix / dropping a product line / fixation of selling price / make or buy decisions/Key Factor Analysis)
		CO3	Given information about relevant expenses, a student will be able to **classify** the cost by nature and **estimate** cost of operating a service

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2. Fostering conducive atmosphere for research and development through well-equipped laboratories and qualified personnel in collaboration with global organizations.

		CO4	Given an information about Expenses & Income / Receipt & Payment / Projected Sales, a student will be able to **prepare** relevant functional level budgets for an organisation
		CO5	Given information about standard and actual performance, the student will be able to **determine** Direct Material and Direct Labour Variances.
IInd	MANAGEMENT CASE ANALYSIS	**CO1**	Given a situation a student will be able to **construct** SWOT for a concerned orgnaisation or situation as well as he/she will be able to indentify key actors/stakeholders in the given situation
		CO2	A student will be able to **evaluate** the dilemma (Problem/ Issues/ Concerns) in the case.
		CO3	A student will be able to **develop** suitable alternatives for the dilemma identified.
		CO4	A student will be able to **analyse** and **evaluate** the alternatives using the theoretical framework.
		CO5	A Student will be able to discuss **suggest** suitable roadmaps to overcome the identified dilemma.
IIIrd	SUMMER INTERNSHIP PROJECT	**CO1**	Student is able to **construct** the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.
		CO2	For his / her organization of internship, the student is able to **assess** its Strengths, Weaknesses, Opportunities and Threats (SWOT). Student is able to **determine** the challenges and future potential for his / her internship organization in particular and the sector in general.
		CO3	Student is able to **test** the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
		CO4	Student is able to **apply** various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
		CO5	Student is able to **analyze** the functioning of internship organization and **recommend** changes for improvement in processes.
IIIrd	MM1: SALES AND DISTRIBUTION MANAGEMENT	**CO1**	Given a situation, student manager will be able to **identify** appropriate Sales Forecasting method to be adopted by a company.
		CO2	Given a situation of newly launched company, student manager will be able to **design** an effective Sales Compensation Plan for Sales Executive.
		CO3	Given a situation of distribution channel of a company, student manager will be able to **outline** different levels of Marketing channel used by the company.
		CO4	Given a situation, student manager will be able to **describe** the process ofSupply Chain and Reverse Logistics.

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		CO5	Given a situation, student manager will be able to **develop** e-retailing strategy as a channel of distribution.
IIIrd	MM2: DIGITAL AND SOCIAL MEDIA MARKETING	**CO1**	On studying this module, the students will be able to **understand** the concept of marketing in digital environment. They will also be able to **relate** traditional marketing concepts with digital marketing and evaluate the use of various channel options available for digital marketing
		CO2	On completing this module, the students will **develop** the concept of digital marketing research. They will also be able to **examine** online consumer behaviour and imagine its utility in online/offline marketing strategies
		CO3	Upon studying this module, the students will be able to **build** an understanding of search engines and their utility in digital marketing area. They will also **comprehend** optimization and the keyword search methodology.
		CO4	On properly studying this module, the student will be able to **examine** the utility of different social media in digital marketing and **evaluate** their use, as future managers, in actual marketing campaigns.
		CO5	On studying this module, the student will be able to **create** favourable online reputation, later, as future managers, for organizations they serve. Students will also be able to **form** opinion on current trends in digital marketing area and **estimate** future trends therein.
IIIrd	MM3: INTEGRATED MARKETING COMMUNICATION AND BRAND MANAGEMENT	**CO1**	At the end of the course the student manager shall be able to **Design** the Integrated marketing communication Process for a company/product
		CO2	At the end of the course the student manager shall be able to **develop** a creative message strategy for a product and execute it.
		CO3	At the end of the course the student manager shall be able to **implement** and evaluate a IMC campaign.
		CO4	At the end of the course the student manager shall be able to **Identify**&**Establish** Brand Positioning for a given product

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		CO5	At the end of the course the student manager shall be able to **design/develop** branding strategies for a product/company, brand marketing program and shall be able to evaluate a branding program.
IIIrd	FM1: INVESTMENT ANALYSIS & PORTFOLIO MANAGEMENT	**CO1**	The student will be able to **apply** concept oftime value of money in computing the value of fixed income securities. The student will also be able to **understand** the relationship between interest rates, yield and bond prices.
		CO2	The student will be able to **compute and compare** the value of a company's equity share with other company's equity by using various methods and tools of equity valuation
		CO3	The student will be able to **build and evaluate** the relationship between the concept of risk and return and will be able to **relate** its implication on creating portfolio.
		CO4	The student will be able to **learn** the theoretical concepts of underlying the portfolio creation
		CO5	The student will be able to **assess** the tools and strategies for portfolio creation and evaluation and will also be able to **evaluate** the portfolios of mutual funds by using the tools of portfolio evaluation
IIIrd	FM2: PROJECT APPRAISAL AND FINANCE	**CO1**	The student will be able to **assess** capital budgeting decisions under uncertain and risk bearing situation and will also be able to **build** and **interpret** the decision tree approach for decision making
		CO2	The student will be able to **choose** between acquisition of long term assets either through lease or financing methods and will also be able to **learn** process of Private Equity and Venture Capital
		CO3	The student will be able to **compare** the various theories of capital structure and will be able to **determine** the impact of debt equity mix on value of firm
		CO4	The student will be able to **evaluate** and **compare** the pre and post merger financial position of the firms.
		CO5	The student will be able to **determine/ estimate** the cash requirement in a firm and will also be able to **evaluate** the impact of trade receivable policy of a firm on its profitability.
IIIrd	FM3: FINANCIAL DERIVATIVES	**CO1**	The student will be able to **describe** the concepts of derivatives and its trading and settlement procedures
		CO2	The student will be able to **calculate** the value of Futures and **apply** it for risk managed trading strategies.
		CO3	The student will be able to **compute** the value of Options and **plan** various option strategies.

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		CO4	The student will be able to **analyse and use** the concept of Swaps and will also be able to make Swaps related decisions.
		CO5	The student will be able to **relate** concept of foreign exchange in currency conversion and **apply** currency forward rate agreements for hedging.
IIIrd	HRM1: MANPOWER PLANNING, RECRUITMENT AND SELECTION	**CO1**	Students should be able to **explain** the factors affecting HRP and HRP process of an organisation.
		CO2	Students should be able to **determine** the process of demand and supply forecasting while doing human resource planning.
		CO3	Students should be able to **devise** the manpower plan for an organisation.
		CO4	Students should be able to **formulate** Recruitment and Selection process on the basis of HRP.
		CO5	Students should be able to **outline** the Recent Trends in Manpower Development and Planning
IIIrd	HRM2: PERFORMANCE MEASUREMENT SYSTEM	**CO1**	Students should be able to **distinguish** the concept of Performance appraisal & Performance Management and also should be able to establish relationship of performance management with Strategic Planning.
		CO2	Students should be able to **determine** the Mechanism of Performance Management, and also explain the various steps in performance planning and performance execution.
		CO3	Students should be able to **justify** the use of various modern and traditional methods of Performance Appraisal under given situation.
		CO4	Students should be able to **justify** the use of various Performance Assessment Models under given situations; also the student should be able to determine the steps of giving a constructive feedback.
		CO5	Students should be able to **discuss** the importance and Principles of ethics in performance management.
IIIrd	HRM3: COMPENSATION AND BENEFITS MANAGEMENT	**CO1**	Students should be able to **compare** the applicability of various Job Evaluation methods under given situations.
		CO2	Students should be able to **determine** the importance of Wage Differentials and **Differentiate** between different types of wages

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		CO3	Students should be able to **align** the compensation strategy with business strategy
		CO4	Students should be able to **design and develop** the incentive and benefits plans
		CO5	Students should be able to **outline** the various Statutory Provisions related to Compensation
IIIrd	BA1: DATA VISUALIZATION FOR MANAGERS	**CO1**	The student will be able to **identify** and **use**Interactive data visualization software desktop tools and will also be able to **create**Interactive data visualization software desktop workspace
		CO2	The student will be able to **connect** data and will also be able to **use**Interactive data visualization software's File Types effectively.
		CO3	The student will be able to create analytics pane and will also be able to use Sort, Filters, Sets, Groups and Hierarchy functions
		CO4	The student will be able to **create** calculations to enhance the data visualisation
		CO5	The student will be able to **build** effective dashboard
IIIrd	BA2: DATA MINING	**CO1**	Given overview of Data Mining and Data pre-processing, the future manager will be able to **outline** major research challenges of data mining, Kinds of data and applications, Data Cleaning; Data Integration; Data Reduction; Data Transformation and Data Discretization.
		CO2	Given the overview of Data Warehousing, the future manager will be able to classify the Concept of Data Warehousing using Data Cube and OLAP and also able to identify the process of Data Generalisation
		CO3	Given the details pertaining to Pattern Mining, the future manager will be able to evaluate Patterns using colossal patterns, mining compressed or approximate patterns; explore patterns and its applications.
		CO4	Given the details pertaining to Pattern Mining, the future manager will be able to analyse clusters using partitioning method, hierarchical method, density based method and grid based method
		CO5	Given the details pertaining to Pattern Mining, the future manager will be able to correlate the use of data mining to the society and also will be able to explain the trend in data mining.
IIIrd	BA3: DATA SCIENCE USING R	**CO1**	Given overview of types of Data, the future manager will be able to **read** data from different files and create matrices and data frames using R
		CO2	Given the overview of functions, subset and loop; the future manager will be able to **explain** the character functions, date function, package, control statement and do loop.
		CO3	Given the basic statistical data, the future manager will be able to **draw** charts, histogram and plots, and measure central tendencies.

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		CO4	Given the data for testing of hypothesis, the future manager will be able to **test** the hypothesis by applying t-test, ANOVA and Chi-square test
		CO5	Given the data of variables, the future manager will be able to **apply** Linear Regression, Logistic regression, Cluster Analysis, Time Series, Decision Tree and Random Forest
IIIrd	STRATEGIC MANAGEMENT	**CO1**	The student will be able to **evaluate** alternative paradigms of strategy and their influence on strategic decision making.
		CO2	The student will be able to analyse and develop the vision and mission statement for given organisations and will also be able to differentiate between the external and internal components of environment while performing SWOT analysis.
		CO3	The student will be able to design and develop corporate level strategies for any organization.
		CO4	The student will be able to design/develop business level strategies for any organization.
		CO5	The student will be able to evaluateall levels strategies and will also be design/develop functional level strategies for any organization.
IV	MM4: RETAIL SALES MANAGEMENT AND SERVICES MARKETING	**CO1**	On completion of this module the students will be able to **utilise** the knowledge gained on Retail Industry and the existing retail environment. The student will also be able to **plan** their retail business as future manager by **applying** retail segmentation.
		CO2	On completing this module, the students will be able to **take part in** the decisions involved in running a retail firm. They will also be able to form their own **opinion** on various retail formats and **recommend** strategies for retail planning.
		CO3	On completing this module, the students will be able to draw **relationship** between retail merchandising, marketing communication, CRM and retail success· They will also be in a position to **predict** impact of changing trends in Indian market scenario on retail business.
		CO4	On completion of this module, the students will be able to **analyse** concepts, functions, and techniques of the craft of service marketing services and will also be able to **identify** critical issues in service design & delivery. As future managers they will also be able to **adapt** a particular model of service marketing to a firm they work with.

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		CO5	On completing this module, the students will be able to **examine** the **application** of integrated marketing communication (IMC) to retail business and **develop** an effective service marketing system for retail business. Students will also be in a position to **recommend** ethical rules for conduct of retail business in India.
IV	FM4: MANAGING BANKS AND FINANCIAL INSTITUTIONS	**CO1**	The student will be able to **identify** role of banking in economic development of country.
		CO2	The student will be able to **assess** the impact of monetary policy and its instruments on banking sector
		CO3	The student will be able to **analyse** the health and risk of bank balance sheet and will also be able to **appraise** credit management parameters of a bank
		CO4	The student will be able to **identify** the NPAs and will also be able to **appraise** the process of securitisation.
		CO5	The student will be able to **distinguish** the utility of various non banking institutions like insurance, housing finance and credit rating
IV	HRM4: TEAM DYNAMICS	**CO1**	Students should be able to **justify** the applicability of various theories of Motivation in given situation and appraise the role of motivation in Team Behavior
		CO2	Students should be able to **determine** the importance of Interpersonal Communication and application of FIRO-B and Johari Window.
		CO3	Student should be able to explain the various steps of Group Formation and types of team
		CO4	In a given situation, Students should be able to justify the Conflict resolution strategy.
		CO5	Students should be able to apply various OD Intervention tools under given situation.
IV	BA4: WEB AND SOCIAL MEDIA ANALYTICS	**CO1**	The student will be able to **choose** the right tools for website design for measured outcomes.
		CO2	The student will be able to **construct** a modern metrics of better performance from eight specific metrics for web performance.
		CO3	The student will be able to **develop** a model for moving quickly from data to actions on a particular website.
		CO4	The student will be able to **develop** the model for measuring the success of a Mobile & Social Media Campaign..

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		CO5	The student will be able to **develop** a model for the website Outcome.
IV	PROJECT WORK AND VIVA VOCE	**CO1**	In a specialization domain of his / her choice, student manager will be able to choose an appropriate topic for study and will be able to clearly formulate& state a research problem
		CO2	For a selected research topic, student manager will be able to compile the relevant literature and frame hypotheses for research as applicable
		CO3	For a selected research topic, student manager will be able to plan a research design including the sampling, observational, statistical and operational designs if any
		CO4	For a selected research topic, student manager will be able to compile relevant data, interpret & analyze it and test the hypotheses wherever applicable
		CO5	Based on the analysis and interpretation of the data collected, student manager will be able to arrive at logical conclusions and propose suitable recommendations on the research problem
		CO6	Student manager will be able to create a logically coherent project report and will be able to defend his / her work in front of a panel of examiners

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