



MAHAVEER

INSTITUTE OF SCIENCE & TECHNOLOGY

Approved by AICTE, Affiliated to JNTU, Hyderabad.
Vyasapuri, Bandlaguda, Post: Keshavgiri, Hyderabad-500005.

2.6.1 Teachers and students are aware of the stated Programme and course outcomes of the Programmes offered by the institution.

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CODE	COURSE NAME	COURSE OUTCOMES (R22) AERONAUTICAL
B.Tech. I Year I Semester		
MA101BS	MATRICES AND CALCULUS	CO1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations CO2: Find the Eigen values and Eigen vectors CO3: Solve the applications on the mean value theorems CO4: Evaluate the improper integrals using Beta and Gamma functions CO5: Evaluate the multiple integrals and apply the concept to find areas, volumes
PH102BS	APPLIED PHYSICS	CO1: Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. CO2: Identify the role of semiconductor devices in science and engineering Applications CO3: Explore the fundamental properties of dielectric, magnetic materials and energy for their applications CO4: Appreciate the features and applications of Nanomaterials CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
ME103ES	C PROGRAMMING AND DATA STRUCTURES	CO1: Understand the various steps in Program development CO2: Explore the basic concepts in C Programming Language. CO3: Develop modular and readable C Programs CO4: Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Data structures. CO5: To understand and analyze various searching and sorting algorithms
ME104ES	ENGINEERING WORKSHOP	CO1: Study and practice on machine tools and their operations CO2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding CO3: : Identify and apply suitable tools for different trades CO4: Identify and apply suitable tools for different trades CO5: Apply basic electrical engineering knowledge for house wiring practice.

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EN105HS	ENGLISH FOR SKILL ENHANCEMENT	CO1: Understand the importance of vocabulary and sentence structures. CO2: Choose appropriate vocabulary and sentence structures for their oral and written communication. CO3: Demonstrate their understanding of the rules of functional grammar CO4: Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts CO5: Acquire basic proficiency in reading and writing modules of English.
ME106ES	ELEMENTS OF MECHANICAL ENGINEERING	CO 1: Understand the operation, usage and applications of different measuring instruments and tools. CO 2: Examine the different characteristics of instruments like accuracy, precision etc CO 3: Prepare simple composite components and joining different materials using soldering process. CO 4: Identify tools & learn practically the process of turning, milling, grinding on mild steel pieces. CO 5: Understand the basic components of IC engine, Gear box and boilers.
PH107BS	APPLIED PHYSICS LABORATORY	CO1: Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment. CO2: Appreciate quantum physics in semiconductor devices and optoelectronics CO3: Gain the knowledge of applications of dielectric constant. CO4: Understand the variation of magnetic field and behavior of hysteresis curve. CO5: Carried out data analysis
EN109HS	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY	CO1: Understand the nuances of English language through audio- visual experience and group activities CO2: To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm CO3: To improve the fluency of students in spoken English and neutralize the impact of dialects.. CO4: Neutralise their accent for intelligibility CO5: Speak with clarity and confidence which in turn enhances their employability skills.
ME108ES	C PROGRAMMING AND DATA	CO1: Develop modular and readable C Programs CO2: Solve problems using strings, functions CO3: Handle data in files

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	STRUCTURES LABORATORY	CO4: Implement stacks, queues using arrays, linked lists CO5: To understand and analyze various searching and sorting algorithms
*MC110	ENVIRONMENTAL SCIENCE	CO1: Understanding the importance of ecological balance for sustainable development. CO2: Understanding the impacts of developmental activities and mitigation measures. CO3 Understanding the environmental policies and regulations CO4 Environmental Pollution and Control Technologies CO5: Environmental Policy, Legislation & EIA
CODE	COURSE NAME	COURSE OUTCOMES R22
B. Tech. I YearII Semester		
MA201BS	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	CO1 Identify whether the given differential equation of first order is exact or not CO2: Solve higher differential equation and apply the concept of differential equation to real world problems. CO3: Use the Laplace transforms techniques for solving ODE's CO4: To introduce components of Low Voltage Electrical Installations CO5: To identify and characterize diodes and various types of transistors.
CH202BS	ENGINEERING CHEMISTRY	CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control. CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes. CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.. CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants..
ME203ES	COMPUTER AIDED ENGINEERING GRAPHICS	CO1: Apply computer aided drafting tools to create 2D and 3D objects CO2 sketch conics and different types of solids CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids CO4: Read and interpret engineering drawings CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting
ME204ES	ENGINEERING	CO1:Determine resultant of forces acting on a body and analyse

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	MECHANIC	<p>equilibrium of a body subjected to a system of forces.</p> <p>CO2:Solve problem of bodies subjected to friction.</p> <p>CO3:Find the location of centroid and calculate moment of inertia of a given section.</p> <p>CO4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion..</p>
ME205PC	ENGINEERING MATERIALS	<p>Co1: Classify the various materials that will be essential for the mechanical engineering applications.</p> <p>Co2:Express the mechanical properties of metals and their testing procedures. Co3: Understand the application of materials and their processing</p> <p>Co4:Understand the requirement and need for the development of the new materials</p>
ME206ES	PYTHON PROGRAMMING LABORATORY	<p>CO1: Develop the application specific codes using python.</p> <p>CO2: To learn control structures.</p> <p>CO3: Understand Strings, Lists, Tuples and Dictionaries in Python</p> <p>CO4: Verify programs using modular approach, file I/O, Python standard library</p> <p>CO5: Implement Digital Systems using Python.</p>
CH207BS	ENGINEERING CHEMISTRY LABORATORY	<p>CO1: Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.</p> <p>CO2: Able to perform methods such as conductometry, potentiometry and pH metry in order to findequation</p> <p>CO3Students are able to prepare polymers like bakelite and nylon-6.</p> <p>CO4: Estimations saponification value, surface tension and viscosity of lubricant oils.</p>
ME208PC	FUELS & LUBRICANTS LABORATORY	<p>Co1:Find the kinematic viscosity of lubricants and its variation with temperature</p> <p>Co2:Determine the flash point, fire point, cloud point and pour point of liquid fuels</p> <p>CO3:Determine the calorific value of solid, liquid and gaseous fuels</p> <p>CO4:Determination of the dropping point of lubricating grease</p> <p>CO5:Determination of distillation characteristics of petroleum products</p>

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CODE	COURSE NAME	COURSE OUTCOMES (R22) CIVIL
B.Tech. I Year I Semester		
	MATRICES AND CALCULUS	CO1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations CO2: Find the Eigen values and Eigen vectors CO3: Solve the applications on the mean value theorems CO4: Evaluate the improper integrals using Beta and Gamma functions CO5: Evaluate the multiple integrals and apply the concept to find areas, volumes
	APPLIED PHYSICS	CO1: Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. CO2: Identify the role of semiconductor devices in science and engineering Applications CO3: Explore the fundamental properties of dielectric, magnetic materials and energy for their applications CO4: Appreciate the features and applications of Nanomaterials CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
	C PROGRAMMING AND DATA STRUCTURES	CO1: Understand the various steps in Program development CO2: Explore the basic concepts in C Programming Language. CO3: Develop modular and readable C Programs CO4: Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Data structures. CO5: To understand and analyze various searching and sorting algorithms
	ENGINEERING WORKSHOP	CO1: Study and practice on machine tools and their operations CO2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding CO3: : Identify and apply suitable tools for different trades CO4: Identify and apply suitable tools for different trades CO5: Apply basic electrical engineering knowledge for house wiring practice.

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	<p>ENGLISH FOR SKILL ENHANCEMENT</p>	<p>CO1: Understand the importance of vocabulary and sentence structures. CO2: Choose appropriate vocabulary and sentence structures for their oral and written communication. CO3: Demonstrate their understanding of the rules of functional grammar CO4: Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts CO5: Acquire basic proficiency in reading and writing modules of English.</p>
	<p>ELEMENTS OF CIVIL ENGINEERING</p>	<p>CO1: Understands the method and ways of investigations required for Civil Engineering projects CO2: Identify the various rocks, minerals depending on geological classifications CO3: Evaluate the properties of cement, fine and coarse aggregates and determine its suitability for construction.</p>
	<p>APPLIED PHYSICS LABORATORY</p>	<p>CO1: Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment. CO2: Appreciate quantum physics in semiconductor devices and optoelectronics CO3: Gain the knowledge of applications of dielectric constant. CO4: Understand the variation of magnetic field and behavior of hysteresis curve. CO5: Carried out data analysis</p>
	<p>ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY</p>	<p>CO1: Understand the nuances of English language through audio- visual experience and group activities CO2: To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm CO3: To improve the fluency of students in spoken English and neutralize the impact of dialects.. CO4: Neutralise their accent for intelligibility CO5: Speak with clarity and confidence which in turn enhances their employability skills.</p>
	<p>C PROGRAMMING AND DATA STRUCTURES LABORATORY</p>	<p>CO1: Develop modular and readable C Programs CO2: Solve problems using strings, functions CO3: Handle data in files CO4: Implement stacks, queues using arrays, linked lists CO5: To understand and analyze various searching and sorting algorithms</p>

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	ENVIRONMENTAL SCIENCE	CO1: Understanding the importance of ecological balance for sustainable development. CO2: Understanding the impacts of developmental activities and mitigation measures. CO3 Understanding the environmental policies and regulations CO4 Environmental Pollution and Control Technologies CO5: Environmental Policy, Legislation & EIA
CODE	COURSE NAME	COURSE OUTCOMES R22
B. Tech. I YearII Semester		
	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	CO1 Identify whether the given differential equation of first order is exact or not CO2: Solve higher differential equation and apply the concept of differential equation to real world problems. CO3: Use the Laplace transforms techniques for solving ODE's CO4: To introduce components of Low Voltage Electrical Installations CO5: To identify and characterize diodes and various types of transistors.
	ENGINEERING CHEMISTRY	CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control. CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes. CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.. CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants..
	COMPUTER AIDED ENGINEERING GRAPHICS	CO1: Apply computer aided drafting tools to create 2D and 3D objects CO2sketch conics and different types of solids CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids CO4: Read and interpret engineering drawings CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting
	APPLIED MECHANIC	CO1:Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces. CO2:Solve problem of bodies subjected to friction. CO3:Find the location of centroid and calculate moment of inertia of a given section.

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		CO4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion..
	SURVEYING	CO1: Calculate angles, distances and levels CO2: Identify data collection methods and prepare field notes CO3: Understand the working principles of survey instruments CO4: Estimate measurement errors and apply corrections CO5: Interpret survey data and compute areas and volumes.
	PYTHON PROGRAMMING LABORATORY	CO1: Develop the application specific codes using python. CO2: To learn control structures. CO3: Understand Strings, Lists, Tuples and Dictionaries in Python CO4: Verify programs using modular approach, file I/O, Python standard library CO5: Implement Digital Systems using Python.
	ENGINEERING CHEMISTRY LABORATORY	CO1: Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions. CO2: Able to perform methods such as conductometry, potentiometry and pH metry in order to find equation CO3: Students are able to prepare polymers like bakelite and nylon-6. CO4: Estimations saponification value, surface tension and viscosity of lubricant oils.
	SURVEYING LABORATORY	CO1: Student will be able to prepare Map and Plan for required site with suitable scale. CO2: Student will be able to prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment. CO3: Student will be able to judge which type of instrument to be used for carrying out survey for a Particular Area and estimate the area. CO4: Student will be able to judge the profile of ground by observing the available existing contour map

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CODE	COURSE NAME	COURSE OUTCOMES (R22) ELECTRICAL & ELECTRONICS ENGINEERING
B.Tech. I Year I Semester		
	MATRICES AND CALCULUS	CO1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations CO2: Find the Eigen values and Eigen vectors CO3: Solve the applications on the mean value theorems CO4: Evaluate the improper integrals using Beta and Gamma functions CO5: Evaluate the multiple integrals and apply the concept to find areas, volumes
	ENGINEERING CHEMISTRY	CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control. CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes. CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.. CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants..
	C PROGRAMMING AND DATA STRUCTURES	CO1: Understand the various steps in Program development. CO2: Explore the basic concepts in C Programming Language. CO3: Develop modular and readable C Programs CO4: Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Data structures. CO5: Apply data structures such as stacks, queues in problem solving CO6: To understand and analyze various searching and sorting algorithms.
	ELECTRICAL CIRCUIT ANALYSIS-I	CO1: Understand network analysis, techniques using mesh and node analysis. CO2: Evaluate steady state and transient behavior of circuits for DC and AC excitations. CO3: Analyze electric circuits using network theorems and concepts of coupled circuits.
	COMPUTER AIDED ENGINEERING GRAPHICS	CO1: Apply computer aided drafting tools to create 2D and 3D objects CO2: sketch conics and different types of solids CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids CO5: Read and interpret engineering drawings CO6: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting
	ELEMENTS OF	CO1: Verify the basic Electrical circuits through different experiments.

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	ELECTRICAL AND ELECTRONICS ENGINEERING	CO2: Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods. CO3: Analyze the transient responses of R, L and C circuits for different input conditions
	ENGINEERING CHEMISTRY	CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control. CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes. CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.. CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants..
	PROGRAMMING NAD DATA STRUCTURES LABORATORY	CO1: Develop modular and readable C Programs CO2: Solve problems using strings, functions CO3: Handle data in files CO4: Implement stacks, queues using arrays, linked lists. CO5: To understand and analyze various searching and sorting algorithms.
CODE	COURSE NAME	COURSE OUTCOMES R22
B. Tech. I YearII Semester		
	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	CO1 Identify whether the given differential equation of first order is exact or not CO2: Solve higher differential equation and apply the concept of differential equation to real world problems. CO3: Use the Laplace transforms techniques for solving ODE's CO4: To introduce components of Low Voltage Electrical Installations CO5: To identify and characterize diodes and various types of transistors.
	APPLIED PHYSICS	CO1: Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. CO2: Identify the role of semiconductor devices in science and engineering Applications CO3: Explore the fundamental properties of dielectric, magnetic materials and energy for their applications CO4: Appreciate the features and applications of Nanomaterials CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
	ENGINEERING	CO1: Study and practice on machine tools and their operations

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	WORKSHOP	CO2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding CO3: : Identify and apply suitable tools for different trades CO4: Identify and apply suitable tools for different trades CO5: Apply basic electrical engineering knowledge for house wiring practice.
	ENGLISH FOR SKILL ENHANCEMENT	CO1: Understand the importance of vocabulary and sentence structures. CO2: Choose appropriate vocabulary and sentence structures for their oral and written communication. CO3: Demonstrate their understanding of the rules of functional grammar CO4: Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts CO5: Acquire basic proficiency in reading and writing modules of English.
	ELECTRICAL CIRCUIT ANALYSIS -II	CO1: Observe the response of various R, L and C circuits for different excitations. CO2: Examine the behavior of circuits using Fourier, Laplace transforms and transfer function of single port network. CO3: Obtain two port network parameters and applications and design of various filters.
	APPLIED PHYSICS LABORATORY	CO1: Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment. CO2: Appreciate quantum physics in semiconductor devices and optoelectronics CO3: Gain the knowledge of applications of dielectric constant. CO4: Understand the variation of magnetic field and behavior of hysteresis curve. CO5: Carried out data analysis
	APPLIED PYTHON PROGRAMMING LABORATORY	CO1: Build basic programs using fundamental programming constructs CO2: Write and execute python codes for different applications CO3: Capable to implement on hardware boards
	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY	CO1: Understand the nuances of English language through audio- visual experience and group activities CO2: To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm CO3: To improve the fluency of students in spoken English and neutralize the impact of dialects.. CO4: Neutralise their accent for intelligibility



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		CO5: Speak with clarity and confidence which in turn enhances their employability skills.
	ELECTRICAL CIRCUIT ANALYSIS LABORATORY	CO1: Analyze complex DC and AC linear circuits CO2: Apply concepts of electrical circuits across engineering CO3: Evaluate response of a given network by using theorems
	ENVIRONMENTAL SCIENCES	CO1: Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

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CODE	COURSE NAME	COURSE OUTCOMES (R22) CSM(AI&ML)
B.Tech. I Year I Semester		
	MATRICES AND CALCULUS	CO1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations CO2: Find the Eigen values and Eigen vectors CO3: Solve the applications on the mean value theorems CO4: Evaluate the improper integrals using Beta and Gamma functions CO5: Evaluate the multiple integrals and apply the concept to find areas, volumes
	APPLIED PHYSICS	CO1: Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. CO2: Identify the role of semiconductor devices in science and engineering Applications CO3: Explore the fundamental properties of dielectric, magnetic materials and energy for their applications CO4: Appreciate the features and applications of Nanomaterials CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
	PROGRAMMING FOR PROBLEM SOLVING	CO1: To write algorithms and to draw flowcharts for solving problems. CO2: To convert the algorithms/flowcharts to C programs. CO3: To code and test a given logic in the C programming language. CO4: To decompose a problem into functions and to develop modular reusable code. CO5: To use arrays, pointers, strings and structures to write C programs. Searching and sorting problems.
	ENGINEERING WORKSHOP	CO1: Study and practice on machine tools and their operations CO2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding CO3: : Identify and apply suitable tools for different trades CO4: Identify and apply suitable tools for different trades CO5: Apply basic electrical engineering knowledge for house wiring practice.

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	ENGLISH FOR SKILL ENHANCEMENT	<p>CO1: Understand the importance of vocabulary and sentence structures.</p> <p>CO2: Choose appropriate vocabulary and sentence structures for their oral and written communication.</p> <p>CO3: Demonstrate their understanding of the rules of functional grammar</p> <p>CO4: Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts</p> <p>CO5: Acquire basic proficiency in reading and writing modules of English.</p>
	ELEMENTS OF COMPUTER SCIENCE & ENGINEERING	<p>CO1: Know the working principles of functional units of a basic Computer</p> <p>CO2: Understand program development, the use of data structures and algorithms in problem solving.</p> <p>CO3: Know the need and types of operating system, database systems.</p> <p>CO4: Understand the significance of networks, internet, WWW and cyber security.</p> <p>CO5: Understand Autonomous systems, the application of artificial intelligence.</p>
	APPLIED PHYSICS LABORATORY	<p>CO1: Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.</p> <p>CO2: Appreciate quantum physics in semiconductor devices and optoelectronics</p> <p>CO3: Gain the knowledge of applications of dielectric constant.</p> <p>CO4: Understand the variation of magnetic field and behavior of hysteresis curve.</p> <p>CO5: Carried out data analysis</p>
	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY	<p>CO1: Understand the nuances of English language through audio- visual experience and group activitie</p> <p>CO2: To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm</p> <p>CO3: To improve the fluency of students in spoken English and neutralize the impact of dialects..</p> <p>CO4: Neutralise their accent for intelligibility</p> <p>CO5: Speak with clarity and confidence which in turn enhances their employability skills.</p>
	PROGRAMMING	CO1: formulate the algorithms for simple problems

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	FOR PROBLEM SOLVING LABORATORY	CO2: I translate given algorithms to a working and correct program CO3: correct syntax errors as reported by the compilers CO4: identify and correct logical errors encountered during execution CO5: represent and manipulate data with arrays, strings and structures CO6: use pointers of different types CO7: create, read and write to and from simple text and binary files CO8: modularize the code with functions so that they can be reused
CODE	COURSE NAME	COURSE OUTCOMES R22
B. Tech. I Year II Semester		
	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	CO1 Identify whether the given differential equation of first order is exact or not CO2: Solve higher differential equation and apply the concept of differential equation to real world problems. CO3: Use the Laplace transforms techniques for solving ODE's CO4: To introduce components of Low Voltage Electrical Installations CO5: To identify and characterize diodes and various types of transistors.
	ENGINEERING CHEMISTRY	CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control. CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes. CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.. CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants..
	COMPUTER AIDED ENGINEERING GRAPHICS	CO1: Apply computer aided drafting tools to create 2D and 3D objects CO2: sketch conics and different types of solids CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids CO4: Read and interpret engineering drawings CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting
	BASIC ELECTRICAL	CO1: Understand and analyze basic Electrical circuits CO2: Study the working principles of Electrical Machines and

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	ENGINEERING	Transformers CO3: Introduce components of Low Voltage Electrical Installatio
	ELECTRONICS DEVICES AND CIRCUITS	CO1:Acquire the knowledge of various electronic devices and their use on real life. CO2: Know the applications of various devices. CO3:Acquire the knowledge about the role of special purpose devices and their applications.
	ENGINEERING CHEMISTRY LABORATORY	CO1: Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions. CO2: Able to perform methods such as conductometry, potentiometry and pH metry in order to findequation CO3Students are able to prepare polymers like bakelite and nylon-6. CO4: Estimations saponification value, surface tension and viscosity of lubricant oils.
	BASIC ELECTRICAL ENGINEERING LABORATORY	CO1:Verify the basic Electrical circuits through different experiments. CO2:Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods. CO3:Analyze the transient responses of R, L and C circuits for different input conditions.
	PHYTHON PROGRAMMING LABORATORY	CO1:Develop the application specific codes using python. CO2:Understand Strings, Lists, Tuples and Dictionaries in Python CO3:Verify programs using modular approach, file I/O, Python standard library CO4:Implement Digital Systems using Python.

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CODE	COURSE NAME	COURSE OUTCOMES (R22) ELECTRONICS AND COMMUNICATION ENGINEERING
B.Tech. I Year I Semester		
	MATRICES AND CALCULUS	CO1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations CO2: Find the Eigen values and Eigen vectors CO3: Solve the applications on the mean value theorems CO4: Evaluate the improper integrals using Beta and Gamma functions CO5: Evaluate the multiple integrals and apply the concept to find areas, volumes
	APPLIED PHYSICS	CO1: Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. CO2: Identify the role of semiconductor devices in science and engineering Applications CO3: Explore the fundamental properties of dielectric, magnetic materials and energy for their applications CO4: Appreciate the features and applications of Nanomaterials CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
	C PROGRAMMING FOR ENGINEERS	CO1: Draw flowcharts for solving arithmetic and logical problems CO2: Develop modular reusable code by understanding concepts of functions. CO3: Formulate algorithms and programs using arrays, pointers, strings and structures. CO4: Write a programs using Searching and sorting algorithms
	ENGINEERING WORKSHOP	CO1: Study and practice on machine tools and their operations CO2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding CO3: : Identify and apply suitable tools for different trades CO4: Identify and apply suitable tools for different trades CO5: Apply basic electrical engineering knowledge for house wiring practice.
	ENGLISH FOR SKILL ENHANCEMENT	CO1: Understand the importance of vocabulary and sentence structures. CO2: Choose appropriate vocabulary and sentence structures for their oral and written communication. CO3: Demonstrate their understanding of the rules of functional grammar CO4: Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts CO5: Acquire basic proficiency in reading and writing modules of English.

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	ELEMENTS OF ELECTRONICS AND COMMUNICATION ENGINEERING	CO1: Identify the different components used for electronics applications CO2: Measure different parameters using various measuring instruments CO3: Distinguish various signals used for analog and digital communications
	APPLIED PHYSICS LABORATORY	CO1: Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment. CO2: Appreciate quantum physics in semiconductor devices and optoelectronics CO3: Gain the knowledge of applications of dielectric constant. CO4: Understand the variation of magnetic field and behavior of hysteresis curve. CO5: Carried out data analysis
	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY	CO1: Understand the nuances of English language through audio-visual experience and group activities CO2: To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm CO3: To improve the fluency of students in spoken English and neutralize the impact of dialects.. CO4: Neutralise their accent for intelligibility CO5: Speak with clarity and confidence which in turn enhances their employability skills.
	C PROGRAMMING AND DATA STRUCTURES LABORATORY	CO1: Develop modular and readable C Programs CO2: Solve problems using strings, functions CO3: Handle data in files CO4: Implement stacks, queues using arrays, linked lists CO5: To understand and analyze various searching and sorting algorithms
	ENVIRONMENTAL SCIENCE	CO1: Understanding the importance of ecological balance for sustainable development. CO2: Understanding the impacts of developmental activities and mitigation measures. CO3: Understanding the environmental policies and regulations CO4: Environmental Pollution and Control Technologies CO5: Environmental Policy, Legislation & EIA
CODE	COURSE NAME	COURSE OUTCOMES R22

B. Tech. I Year II Semester

	ORDINARY	CO1 Identify whether the given differential equation of first order is exact
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	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	<p>or not</p> <p>CO2: Solve higher differential equation and apply the concept of differential equation to real world problems.</p> <p>CO3: Use the Laplace transforms techniques for solving ODE's</p> <p>CO4: To introduce components of Low Voltage Electrical Installations</p> <p>CO5: To identify and characterize diodes and various types of transistors.</p>
	ENGINEERING CHEMISTRY	<p>CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.</p> <p>CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.</p> <p>CO3: They can learn the fundamentals and general properties of polymers and other engineering materials..</p> <p>CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs</p> <p>CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants..</p>
	COMPUTER AIDED ENGINEERING GRAPHICS	<p>CO1: Apply computer aided drafting tools to create 2D and 3D objects</p> <p>CO2: sketch conics and different types of solids</p> <p>CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids</p> <p>CO4: Read and interpret engineering drawings</p> <p>CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting</p>
	BASIC ELECTRICAL ENGINEERING	<p>CO1: Understand and analyze basic Electrical circuits</p> <p>CO2: Study the working principles of Electrical Machines and Transformers</p> <p>CO3: Introduce components of Low Voltage Electrical Installations.</p>
	ELECTRONIC DEVICES AND CIRCUITS	<p>CO1: Acquire the knowledge of various electronic devices and their use on real life.</p> <p>CO2: Know the applications of various devices.</p> <p>CO3: Acquire the knowledge about the role of special purpose devices and their applications.</p>
	APPLIED PYTHON PROGRAMMING LABORATORY	<p>CO1: Develop the application specific codes using python.</p> <p>CO2: To learn control structures.</p> <p>CO3: Understand Strings, Lists, Tuples and Dictionaries in Python</p> <p>CO4: Verify programs using modular approach, file I/O, Python standard library</p> <p>CO5: Implement Digital Systems using Python.</p>
	ENGINEERING CHEMISTRY LABORATORY	<p>CO1: Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.</p> <p>CO2: Able to perform methods such as conductometry, potentiometry and pH metry in order to find equation</p> <p>CO3: Students are able to prepare polymers like bakelite and nylon-6.</p>



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		CO4: Estimations saponification value, surface tension and viscosity of lubricant oils.
	ELECTRONICS DEVICES AND CIRCUITS LABORATARY	CO1: Acquire the knowledge of various semiconductor devices and their use in real life. CO2: Design aspects of biasing and keep them in active region of the device for functional circuits. CO3: Acquire the knowledge about the role of special purpose devices and their applications.

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CODE	COURSE NAME	COURSE OUTCOMES (R22) COMPUTER SCIENCE & ENGINEERING
B.Tech. I Year I Semester		
	MATRICES AND CALCULUS	CO1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations CO2: Find the Eigen values and Eigen vectors CO3: Solve the applications on the mean value theorems CO4: Evaluate the improper integrals using Beta and Gamma functions CO5: Evaluate the multiple integrals and apply the concept to find areas, volumes
	ENGINEERING CHEMISTRY	CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control. CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes. CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.. CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants..
	PROGRAMMING FOR PROBLEM SOLVING	CO1: To write algorithms and to draw flowcharts for solving problems. CO2: To convert the algorithms/flowcharts to C programs. CO3: To code and test a given logic in the C programming language. CO4: To decompose a problem into functions and to develop modular reusable code. CO5: To use arrays, pointers, strings and structures to write C programs. CO6: Searching and sorting problems
	BASIC ELECTRICAL ENGINEERING	CO1: Understand and analyze basic Electrical circuits CO2: Study the working principles of Electrical Machines and Transformers CO3: Introduce components of Low Voltage Electrical Installations.
	COMPUTER AIDED ENGINEERING GRAPHICS	CO1: Apply computer aided drafting tools to create 2D and 3D objects CO2: sketch conics and different types of solids CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids CO5: Read and interpret engineering drawings CO6: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

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	ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING	CO1: Know the working principles of functional units of a basic Computer CO2: Understand program development, the use of data structures and algorithms in problem solving. CO3: Know the need and types of operating system, database systems. CO4: Understand the significance of networks, internet, WWW and cyber security. CO5: Understand Autonomous systems, the application of artificial intelligence.
	ENGINEERING CHEMISTRY	CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control. CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes. CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.. CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants..
	PROGRAMMING FOR PROBLEM SOLVING LABORATORY	CO1: formulate the algorithms for simple problems CO2: I translate given algorithms to a working and correct program CO3: correct syntax errors as reported by the compilers CO4: identify and correct logical errors encountered during execution CO5: represent and manipulate data with arrays, strings and structures CO6: use pointers of different types CO7: create, read and write to and from simple text and binary files CO8: modularize the code with functions so that they can be reused
	BASIC ELECTRICAL ENGINEERING LABORATORY	CO1: Verify the basic Electrical circuits through different experiments. CO2: Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods. CO3: Analyze the transient responses of R, L and C circuits for different input conditions.
CODE	COURSE NAME	COURSE OUTCOMES R22
B. Tech. I Year II Semester		
	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR	CO1 Identify whether the given differential equation of first order is exact or not CO2: Solve higher differential equation and apply the concept of differential equation to real world problems.

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	CALCULUS	CO3: Use the Laplace transforms techniques for solving ODE's CO4: To introduce components of Low Voltage Electrical Installations CO5: To identify and characterize diodes and various types of transistors.
	APPLIED PHYSICS	CO1: Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. CO2: Identify the role of semiconductor devices in science and engineering Applications CO3: Explore the fundamental properties of dielectric, magnetic materials and energy for their applications CO4: Appreciate the features and applications of Nanomaterials CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
	ENGINEERING WORKSHOP	CO1: Study and practice on machine tools and their operations CO2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding CO3: : Identify and apply suitable tools for different trades CO4: Identify and apply suitable tools for different trades CO5: Apply basic electrical engineering knowledge for house wiring practice.
	ENGLISH FOR SKILL ENHANCEMENT	CO1: Understand the importance of vocabulary and sentence structures. CO2: Choose appropriate vocabulary and sentence structures for their oral and written communication. CO3: Demonstrate their understanding of the rules of functional grammar CO4: Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts CO5: Acquire basic proficiency in reading and writing modules of English.
	ELECTRONICS DEVICES AND CIRCUITS	CO1:Acquire the knowledge of various electronic devices and their use on real life. CO2: Know the applications of various devices. CO3:Acquire the knowledge about the role of special purpose devices and their applications.
	APPLIED PHYSICS LABORATORY	CO1: Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment. CO2: Appreciate quantum physics in semiconductor devices and optoelectronics

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		<p>CO3: Gain the knowledge of applications of dielectric constant.</p> <p>CO4: Understand the variation of magnetic field and behavior of hysteresis curve.</p> <p>CO5: Carried out data analysis</p>
	<p>PYTHON PROGRAMMING LABORATORY</p>	<p>CO1: Develop the application specific codes using python.</p> <p>CO2: To learn control structures.</p> <p>CO3: Understand Strings, Lists, Tuples and Dictionaries in Python</p> <p>CO4: Verify programs using modular approach, file I/O, Python standard library</p> <p>CO5: Implement Digital Systems using Python.</p>
	<p>ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY</p>	<p>CO1: Understand the nuances of English language through audio-visual experience and group activities</p> <p>CO2: To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm</p> <p>CO3: To improve the fluency of students in spoken English and neutralize the impact of dialects..</p> <p>CO4: Neutralise their accent for intelligibility</p> <p>CO5: Speak with clarity and confidence which in turn enhances their employability skills.</p>

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DEPARTMENT OF HUMANITIES & SCIENCES

CODE	COURSE NAME	COURSE OUTCOMES (R22) INFORMATION TECHNOLOGY
B.Tech. I Year I Semester		
	MATRICES AND CALCULUS	CO1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations CO2: Find the Eigen values and Eigen vectors CO3: Solve the applications on the mean value theorems CO4: Evaluate the improper integrals using Beta and Gamma functions CO5: Evaluate the multiple integrals and apply the concept to find areas, volumes
	ENGINEERING CHEMISTRY	CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control. CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes. CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.. CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants..
	PROGRAMMING FOR PROBLEM SOLVING	CO1: To write algorithms and to draw flowcharts for solving problems. CO2: To convert the algorithms/flowcharts to C programs. CO3: To code and test a given logic in the C programming language. CO4: To decompose a problem into functions and to develop modular reusable code. CO5: To use arrays, pointers, strings and structures to write C programs. CO6: Searching and sorting problems
	BASIC ELECTRICAL ENGINEERING	CO1: Understand and analyze basic Electrical circuits CO2: Study the working principles of Electrical Machines and Transformers CO3: Introduce components of Low Voltage Electrical Installations.
	COMPUTER AIDED ENGINEERING GRAPHICS	CO1: Apply computer aided drafting tools to create 2D and 3D objects CO2: sketch conics and different types of solids CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids CO5: Read and interpret engineering drawings CO6: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

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	ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING	CO1: Know the working principles of functional units of a basic Computer CO2: Understand program development, the use of data structures and algorithms in problem solving. CO3: Know the need and types of operating system, database systems. CO4: Understand the significance of networks, internet, WWW and cyber security. CO5: Understand Autonomous systems, the application of artificial intelligence.
	ENGINEERING CHEMISTRY	CO1: Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control. CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes. CO3: They can learn the fundamentals and general properties of polymers and other engineering materials.. CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants..
	PROGRAMMING FOR PROBLEM SOLVING LABORATORY	CO1: formulate the algorithms for simple problems CO2: I translate given algorithms to a working and correct program CO3: correct syntax errors as reported by the compilers CO4: identify and correct logical errors encountered during execution CO5: represent and manipulate data with arrays, strings and structures CO6: use pointers of different types CO7: create, read and write to and from simple text and binary files CO8: modularize the code with functions so that they can be reused
	BASIC ELECTRICAL ENGINEERING LABORATORY	CO1: Verify the basic Electrical circuits through different experiments. CO2: Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods. CO3: Analyze the transient responses of R, L and C circuits for different input conditions.
CODE	COURSE NAME	COURSE OUTCOMES R22
B. Tech. I Year II Semester		
	ORDINARY DIFFERENTIAL EQUATIONS	CO1 Identify whether the given differential equation of first order is exact or not CO2: Solve higher differential equation and apply the concept of

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	AND VECTOR CALCULUS	differential equation to real world problems. CO3: Use the Laplace transforms techniques for solving ODE's CO4: To introduce components of Low Voltage Electrical Installations CO5: To identify and characterize diodes and various types of transistors.
	APPLIED PHYSICS	CO1: Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. CO2: Identify the role of semiconductor devices in science and engineering Applications CO3: Explore the fundamental properties of dielectric, magnetic materials and energy for their applications CO4: Appreciate the features and applications of Nanomaterials CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
	ENGINEERING WORKSHOP	CO1: Study and practice on machine tools and their operations CO2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding CO3: : Identify and apply suitable tools for different trades CO4: Identify and apply suitable tools for different trades CO5: Apply basic electrical engineering knowledge for house wiring practice.
	ENGLISH FOR SKILL ENHANCEMENT	CO1: Understand the importance of vocabulary and sentence structures. CO2: Choose appropriate vocabulary and sentence structures for their oral and written communication. CO3: Demonstrate their understanding of the rules of functional grammar CO4: Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts CO5: Acquire basic proficiency in reading and writing modules of English.
	ELECTRONICS DEVICES AND CIRCUITS	CO1:Acquire the knowledge of various electronic devices and their use on real life. CO2: Know the applications of various devices. CO3:Acquire the knowledge about the role of special purpose devices and their applications.
	APPLIED PHYSICS LABORATORY	CO1: Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment. CO2: Appreciate quantum physics in semiconductor devices and

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		<p>optoelectronics</p> <p>CO3: Gain the knowledge of applications of dielectric constant.</p> <p>CO4: Understand the variation of magnetic field and behavior of hysteresis curve.</p> <p>CO5: Carried out data analysis</p>
	<p>PYTHON PROGRAMMING LABORATORY</p>	<p>CO1: Develop the application specific codes using python.</p> <p>CO2: To learn control structures.</p> <p>CO3: Understand Strings, Lists, Tuples and Dictionaries in Python</p> <p>CO4: Verify programs using modular approach, file I/O, Python standard library</p> <p>CO5: Implement Digital Systems using Python.</p>
	<p>ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY</p>	<p>CO1: Understand the nuances of English language through audio- visual experience and group activities</p> <p>CO2: To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm</p> <p>CO3: To improve the fluency of students in spoken English and neutralize the impact of dialects..</p> <p>CO4: Neutralise their accent for intelligibility</p> <p>CO5: Speak with clarity and confidence which in turn enhances their employability skills.</p>

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CODE	COURSE NAME	COURSE OUTCOMES (R22) MECHANICAL
B.Tech. I Year I Semester		
	MATRICES AND CALCULUS	CO1: Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations CO2: Find the Eigen values and Eigen vectors CO3: Solve the applications on the mean value theorems CO4: Evaluate the improper integrals using Beta and Gamma functions CO5: Evaluate the multiple integrals and apply the concept to find areas, volumes
	APPLIED PHYSICS	CO1: Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. CO2: Identify the role of semiconductor devices in science and engineering Applications CO3: Explore the fundamental properties of dielectric, magnetic materials and energy for their applications CO4: Appreciate the features and applications of Nanomaterials CO5: Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
	C PROGRAMMING AND DATA STRUCTURES	CO1: Understand the various steps in Program development CO2: Explore the basic concepts in C Programming Language. CO3: Develop modular and readable C Programs CO4: Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Data structures. CO5: To understand and analyze various searching and sorting algorithms
	ENGINEERING WORKSHOP	CO1: Study and practice on machine tools and their operations CO2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding CO3: : Identify and apply suitable tools for different trades CO4: Identify and apply suitable tools for different trades CO5: Apply basic electrical engineering knowledge for house wiring practice.

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	<p>ENGLISH FOR SKILL ENHANCEMENT</p>	<p>CO1: Understand the importance of vocabulary and sentence structures. CO2: Choose appropriate vocabulary and sentence structures for their oral and written communication. CO3: Demonstrate their understanding of the rules of functional grammar CO4: Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts CO5: Acquire basic proficiency in reading and writing modules of English.</p>
	<p>ELEMENTS OF MECHANICAL ENGINEERING</p>	<p>CO1: : Understand the operation, usage and applications of different measuring instruments and tools CO2: Examine the different characteristics of instruments like accuracy, precision etc CO3: Prepare simple composite components and joining different materials using soldering process. CO4: Identify tools & learn practically the process of turning, milling, grinding on mild steel pieces CO5: Understand the basic components of IC engine, Gear box and boiler</p>
	<p>APPLIED PHYSICS LABORATORY</p>	<p>CO1: Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment. CO2: Appreciate quantum physics in semiconductor devices and optoelectronics CO3: Gain the knowledge of applications of dielectric constant. CO4: Understand the variation of magnetic field and behavior of hysteresis curve. CO5: Carried out data analysis</p>

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	ENGLISH LANGUAGE AND COMMUNICATIO N SKILLS LABORATORY	CO1: Understand the nuances of English language through audio- visual experience and group activitie CO2: To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm CO3: To improve the fluency of students in spoken English and neutralize the impact of dialects.. CO4: Neutralise their accent for intelligibility CO5: Speak with clarity and confidence which in turn enhances their employability skills.
	C PROGRAMMING AND DATA STRUCTURES LABORATORY	CO1: Develop modular and readable C Programs CO2: Solve problems using strings, functions CO3: Handle data in files CO4: Implement stacks, queues using arrays, linked lists CO5: To understand and analyze various searching and sorting algorithms
	ENVIRONMENTA L SCIENCE	CO1: Understanding the importance of ecological balance for sustainable development. CO2: Understanding the impacts of developmental activities and mitigation measures. CO3 Understanding the environmental policies and regulations CO4 Environmental Pollution and Control Technologies CO5: Environmental Policy, Legislation & EIA
CODE	COURSE NAME	COURSE OUTCOMES R22
B. Tech. I YearII Semester		
	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	CO1 Identify whether the given differential equation of first order is exact or not CO2: Solve higher differential equation and apply the concept of differential equation to real world problems. CO3: Use the Laplace transforms techniques for solving ODE's CO4: To introduce components of Low Voltage Electrical Installations CO5: To identify and characterize diodes and various types of transistors.
	ENGINEERING	CO1: Students will acquire the basic knowledge of electrochemical

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	CHEMISTRY	<p>procedures related to corrosion and its control.</p> <p>CO2: The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.</p> <p>CO3: They can learn the fundamentals and general properties of polymers and other engineering materials..</p> <p>CO4: They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs</p> <p>CO5: To acquire required knowledge about engineering materials like cement, smart materials and Lubricants..</p>
	COMPUTER AIDED ENGINEERING GRAPHICS	<p>CO1: Apply computer aided drafting tools to create 2D and 3D objects</p> <p>CO2: sketch conics and different types of solids</p> <p>CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids</p> <p>CO4: Read and interpret engineering drawings</p> <p>CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting</p>
	ENGINEERING MECHANIC	<p>CO1: Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.</p> <p>CO2: : Solve problem of bodies subjected to friction</p> <p>CO3: Find the location of centroid and calculate moment of inertia of a given section</p> <p>CO4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.</p> <p>CO5: Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration.</p>
	ENGINEERING MATERIALS	<p>CO1: Classify the various materials that will be essential for the mechanical engineering applications</p> <p>CO2: Introduce the testing methods for various material properties and ASTM standards used in testing.</p> <p>CO3: Express the mechanical properties of metals and their testing procedures.</p> <p>CO4: CO4: Understand the application of materials and their processing</p> <p>CO5: Understand the requirement and need for the development of the new materials.</p>
	PYTHON PROGRAMMING	<p>CO1: Develop the application specific codes using python.</p> <p>CO2: To learn control structures.</p> <p>CO3: Understand Strings, Lists, Tuples and Dictionaries in Python</p>

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	LABORATORY	CO4: Verify programs using modular approach, file I/O, Python standard library CO5: Implement Digital Systems using Python.
	ENGINEERING CHEMISTRY LABORATORY	CO1: Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions. CO2: Able to perform methods such as conductometry, potentiometry and pH metry in order to findequation CO3Students are able to prepare polymers like bakelite and nylon-6. CO4: Estimations saponification value, surface tension and viscosity of lubricant oils.
	FUELS AND LUBRICANTS LABORATORY	CO1: Find the kinematic viscosity of lubricants and its variation with temperature CO2: Determine the flash point, fire point, cloud point and pour point of liquid fuels CO3: Determine the calorific value of solid, liquid and gaseous fuels CO4: Determination of the dropping point of lubricating grease CO5Determination of distillation characteristics of petroleum products

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AERONAUTICAL ENGINEERING				
	Programme : UG	AERONAUTICAL	A.Y: 2020-21	SEMESTER: I/II
Sl. No	Year/Sem	Subject Code	Subject Name	Course Outcomes
1	II-I	MA301BS	Probability and Statistics & Complex Variables	CO1: Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.
				CO2: Application of cauchy residue theorem to fluid mechanics problems
				CO3: Analyse the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems.
				CO4: Taylor's and Laurent's series expansions of complex function.
				CO5: Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
2	II-I	EE300ES	Basic Electrical and Electronics Engineering	CO1: To analyze and solve electrical circuits using network laws and theorems
				CO2: To understand and analyze basic Electric and Magnetic circuits
				CO3: To study the working principles of Electrical Machines
				CO4: To introduce components of Low Voltage Electrical Installations
				CO5: To identify and characterize diodes and various types of transistors
3	II-I	AE303PC	Theory of Structures	CO1: Describe the types of loads , materials and properties of aircraft structures
				CO2: Calculate the response of statically determinate and indeterminate structures under various loading conditions
				CO3: Apply the theories of elasticity to predict failure of aircraft structures
				CO4: Study of eigen values and eigen modes to understand beam theory
				CO5: Prediction of deflection of beams using various theorems
4	II-I	AE304PC	Fluid Mechanics and	CO1: Basic fluid mechanics and description of fluid motion





			Hydraulics	<p>CO2: Various equations to solve fluid dynamics problems</p> <p>CO3: Concept of boundary layer</p> <p>CO4: Understanding of fluid measurements and its importance</p> <p>CO5: Understanding of eulers turbo machinery equation of fluid machinary</p>
5	II-I	AE305PC	Aerodynamics - 1	<p>CO1:Theoretical Aerodynamics</p> <p>CO2:Conformal Transformation</p> <p>CO3: Understanding of potencial flows</p> <p>CO4: Study of various panel methods</p> <p>CO5: study of lifting line thoery and its applications</p>
6	II- I	AE306PC	Mechanics of Solids Lab	<p>CO1: Identify microstructures and wear properties of engineering materials.</p> <p>CO2: Examine the defects in the materials by non-destructive testing</p> <p>CO3: Test the important mechanical properties of ferrous and non-ferrous materials.</p> <p>CO4: Torsion and tension test over mild steel</p> <p>CO5: deflection study for cantilever beam</p>
7	II- I	AE307PC	Fluid Mechanics and Hydraulics Lab	<p>CO1: Obtain the necessary practical skills & real time knowledge</p> <p>CO2: Apply scientific method for analysing the qualitatively & quantitatively to solve the problems.</p> <p>CO3: Flow behaviour in various geometry of cross sectional</p> <p>CO4: Study of pumps</p> <p>CO5: Hydraulic turbines</p>
8	II- I	AE309PC	Basic Electrical and Electronics Engineering Lab	<p>CO1:To analyze and solve electrical circuits using network laws and theorems.</p> <p>CO2:To understand and analyze basic Electric and Magnetic circuits</p> <p>CO3: To study the working principles of Electrical Machines</p> <p>CO4: To introduce components of Low Voltage Electrical Installations</p> <p>CO5: To identify and characterize diodes and various types of transistors</p>
9	II- I	MC309	Constitution of India	<p>CO1: Understand meaning, features, characteristics of constitution law and constitutionalism.</p> <p>CO2: Describe fundamental rights, fundamental dutiesand its legal status.</p> <p>CO3: Describe The constitution powers and status</p>





				of the President of India.
				CO4: Understand Emergency Provisions: National Emergency, President Rule, And Financial Emergency.
				CO5: Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19.
10	III- I	AE501PC	Aircraft Propulsion	CO1: Review the basic thermodynamic principles and fundamentals of gas turbine engines
				CO2: Outline the concepts of subsonic and supersonic inlets for jet engines
				CO3: Evaluate the operating characteristics of compressors and turbines in terms of blade shapes, angles, and direction of rotation
				CO4: Describe the fundamentals of combustion chamber, nozzle, ramjet and rocket propulsion
				CO5: Parametric cyclic analysis, performance parameters, efficiency, specific impulse of all air breathing engines
11	III- I	AE502PC	High Speed Aerodynamics	CO1: Air compressibility and isentropic relations inform of speed
				CO2: Shock and expansion waves
				CO3: Supersonic wind tunnel, nozzle design, flow visualisation technique
				CO4: Effects of Shock and Expansion waves on aerodynamic characteristics
				CO5: Basic governing equations of compressible flows and its parameters
12	III- I	AE503PC	Finite Element Methods	CO1: Study of various finite elements and its importance
				CO2: Apply finite element method to solve problems in solid mechanics,
				CO3: Fluid mechanics and heat transfer. Formulate and solve problems in one dimensional structures including trusses,
				CO4: Beams and frames. Formulate FE characteristic equations for two dimensional elements and analyze plain stress,
				CO5: Plain strain, axi-symmetric and plate bending problems. ANSYS, ABAQUS, NASTRAN, etc.
13	III- I	SM504MS	Business	CO1: Basic study on various Forms of Business





			Economics and Financial Analysis	<p>CO2: The impact of economic variables on the Business.</p> <p>CO3: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.</p> <p>CO4: The Students can study the firm's financial position by analysing</p> <p>CO5: The Financial Statements of a Company.</p>
14	III- I	AE505PC	Aircraft Systems and Controls	<p>CO1: The principles of flight control</p> <p>CO2: The principle and working of electronic and mechanical control systems</p> <p>CO3: Various types of aircraft instruments</p> <p>CO4: Static & dynamic characteristics of instruments</p> <p>CO5: Gyroscope and its applications</p>
15	III- I	AE506PC	Aircraft Performance and Stability	<p>CO1: Aerodynamic characteristics, engine performance, and effects of flight altitude on aircraft performance</p> <p>CO2: Predict and analyse the performance of an airplane for accelerating and Non-accelerating cases</p> <p>CO3: Calculate the range and endurance of propeller and jet driven airplane</p> <p>CO4: Describe the different aircraft maneuvers</p> <p>CO5: Understanding of take off and landing performance</p>
16	III- I	AE507PC	Computer Aided Aircraft Engineering Drawing	<p>CO1: Exposure to computer aided design and drafting software</p> <p>CO2: Learn part design and assembly by design tool</p> <p>CO3: Design and assembly of fuselage wings and components</p> <p>CO4: Design of landing gear and other sub systems</p> <p>CO5: Design of nose cone structure</p>
17	III- I	AE508PC	Flight Control Lab	<p>CO1: Exposure to flight simulation</p> <p>CO2: Exposure to MATLAB</p> <p>CO3: Classify the quasilinear partial differential equation for the mathematical behavior.</p> <p>CO4: Demonstrate the finite-difference by replacing the partial derivative with a suitable algebraic difference quotient for coding purpose</p> <p>CO5: Exposure to stimulation software</p>
18	III- I	AE509PC	Aircraft Propulsion Lab	<p>CO1: To understand how to do the heat transfer analysis over the surface of the aircraft structure,</p> <p>CO2: Study of different jet engines</p> <p>CO3: Students understand design requirements of</p>





				engine and aircraft. CO4: Understand the performance aspects at the design point and off design operations. CO5: Exposure with reference to numerical calculations and design limitations.
19	III- I	*MC510	Intellectual Property Rights	CO1: Allows students how to prepare and protect the Inventions , start up ideas and CO2: Rights of patents and copy rights etc., CO3: This subject brings awareness to the students the basic legal aspects at present following at Global level. CO4: To learn the procedure of obtaining Patents, Copyrights, Trade Marks & Industrial Design CO5: Provide the knowledge on International IPR's and to make students efficient to take decisions in Global Corporate.
20	IV-I	AE701PC	Flight Vehicle Design	CO1: Students can complete conceptual design of a transport and fighter aircraft CO2: Estimate its performance including handling qualities against given requirements. CO3: Students acquire knowledge of design process of an aircraft CO4: Student to complete conceptual design to meet specified system requirements CO5: Student will be able to develop preliminary design of a given aircraft
21	IV-I	AE702PC	Mechanical Vibration and Structural Dynamics	CO1: Fundamental frequency of Multi- DOF systems can estimate by various methods. CO2: Effect of unbalance in rotating masses has been studied. CO3: Response to arbitrary loading: Duhamel's integral, Impulse loading CO4: Exposure on damped and undamped vibratory systems CO5: Basic knowledge on dynamic balancing of rotor system
22	IV-I	AE722PE	AIRCRAFT MAINTENANCE ENGINEERING	CO1: To know the philosophy of Aircraft Maintenance CO2: Development of Maintenance Programs, Certification and Maintenance Documentation CO3: Study of Various Technical Services CO4: Maintenance and Material Support: CO5: Study of Oversight Functions





23	IV-I	ME732PE	Computational Fluid Dynamics	CO1: Study of Aerodynamics with traditional analytical approaches.
				CO2: Ability to undertake problem identification, formulation and solution and apply knowledge of
				CO3: basic computational equations and engineering fundamentals.
				CO4: Developing a geometrical model of the flow, applying appropriate boundary conditions,
				CO5: Specifying solution parameters, and visualizing and analyzing the results.
24	IV-I	AE711PE	Space Mechanics	CO1: Solar Systems and various coordinate systems
				CO2: Effect of perturbation on satellite
				CO3: Study of Satellite orbits
				CO4: calculations of Missile trajectory
				CO5: Rocket motors and thrust calculations
25	IV-I	AE703PC	Flight Vehicle Design and Instrumentation Lab	CO1: Student will be able to develop preliminary design of a given aircraft
				CO2: Able to use various software tools in design & analysis of aircraft
				CO3: conceptual aircraft design of a typical civil transport and fighter aircraft
				CO4: To use various tools (software) in flight vehicle design to meet given system requirements
				CO5: student to complete conceptual design to meet specified system requirements
26	IV-I	AE704PC	Computational Fluid Dynamics Lab	CO1: Students will develop a better intuition of Aerodynamics more quickly than is possible with traditional analytical approaches.
				CO2: Ability to undertake problem identification, formulation and solution and apply knowledge of
				CO3: basic science and engineering fundamentals.
				CO4: Developing a geometrical model of the flow, applying appropriate boundary conditions,
				CO5: specifying solution parameters, and visualizing and analyzing the results.
27	IV-I	AE811PE	Industry Oriented Mini Project	CO1: Apply fundamental concepts and methods of their engineering field.
				CO2: Use effectively oral, written and visual communication.
				CO3: Understand working with teams.
				CO4: Understand advanced research methodologies in the field of computer science engineering.





				CO5: Demonstrate their understanding of discussions and spark further discussion.
28	IV-I		Seminar	CO1: Identify understand and discuss current issues in the engineering field.
				CO2: Analyze a problem, identify and define the computing requirements appropriate to its solutions.
				CO3: Function effectively on teams to accomplish a common goal.
				CO4: Use current techniques, skill and tools necessary for computing practices.
				CO5: Demonstrate the knowledge, skills and attitudes of a professional engineer.
29	IV-I		Project Stage - I	CO1: Demonstrate a sound technical knowledge of their selected project
				CO2: Undertake problem identification, formulation and solution.
				CO3: Design engineering solutions to complex problems utilising a systems approach.
				CO4: Conduct an engineering project
				CO5: Communicate with engineers and the community at large in written an oral forms
30	II-II	AE401ES	Probability Distributions and Numerical Methods	CO1: Formulate and solve problems involving the multiple random variables and the ANOVA for analysing the experimental data
				CO2: Find a better approximate root of a given equation
				CO3: Fit a linear, non-linear and exponential curve for the given data.
				CO4: Solve the initial value problems.
				CO5: Evaluate the derivative at a given value and integral of a function.
31	II-II	AE402PC	Low Speed Aerodynamics	CO1: Introduction to Low speed aerodynamics
				CO2: Aerofoil and wing Theory
				CO3: Concept of boundary layers
				CO4: know the different type of testing methods
				CO5: effects of Shock and Expansion waves on aerodynamic characteristics
32	II-II	AE403PC	Aircraft Materials and Production	CO1: Describe the basics of manufacturing processes, techniques, and quality process.
				CO2: Composite material, properties and characteristics.
				CO3: Ability to demonstrate the behavior of major aircraft structural components





				<p>CO4: To provide the students various methods for analysis of aircraft wings</p> <p>CO5: Conventional and Unconventional Machining Processes</p>
33	II-II	AE404PC	Analysis of Aircraft Structures	<p>CO1: Types of structure used in aircraft and various loads experienced by components</p>
				<p>CO2: Thin Plate Theory, Structural Instability:</p>
				<p>CO3: Bending, Shear and Torsion of Thin Walled Beams</p>
				<p>CO4: concept on Structural Idealization</p>
				<p>CO5: Analysis of Fuselage, Wing and Landing Gear</p>
34	II-II	AE405PC	Aero-Thermodynamics	<p>CO1: basic knowledge about thermodynamic laws and relations, and their application to various processes.</p>
				<p>CO2: First Law of Thermodynamics</p>
				<p>CO3: Second Law of Thermodynamics</p>
				<p>CO4: Properties of Pure Substances and Power Cycle:</p>
				<p>CO5: Air Standard Cycles and IC Engines</p>
35	II-II	AE406ES	Aerodynamics Lab	<p>CO1: Point out the pressure distribution of symmetrical and unsymmetrical airfoil and 2D cylinder</p>
				<p>CO2: Examine flow visualization of airfoil and bluff bodies</p>
				<p>CO3: pressure distribution over circular, symmetric and cambered airfoils and evaluate lift and drag.</p>
				<p>CO 4: flow visualization studies at low speeds over different aerodynamic bodies.</p>
				<p>CO 5: students know the tooling methods</p>
36	II-II	AE407PC	Aerospace Structures Lab	<p>CO 1: Various load testing methodology and selecting the suitable structure for different components</p>
				<p>CO 2: buckling strength of both long and short columns using different elastic supports</p>
				<p>CO 3: Concept of locating the shear centre for open and closed section of beams</p>
				<p>CO 4: Crack detection using various NDT methods</p>
37	II-II	AE408PC	Aircraft Materials and Production Lab	<p>CO 1: Operate the various machines used in production, different welding techniques</p>
				<p>CO 2: Basic computer numerical control machining operation required for aircraft production technology.</p>
				<p>CO 3: Conventional machining operation using for aircraft structural members production</p>
				<p>CO 4: Unconventional machining techniques required</p>





				for aircraft production
38	II-II	*MC409	Gender Sensitization Lab	CO 1: Students will have developed a better understanding of important issues related to gender in contemporary India
				CO 2: Students will attain a finer grasp of how gender discrimination works in our society and how to counter it
				CO 3: Students will acquire insight into the gendered division of labour and its relation to politics and economic
				CO 4: Men and women students and professionals will be better equipped to work and live together as equals.
				CO 5: Students will develop a sense of appreciation of women in all walks of life
39	III-II	AE601PC	Space Propulsion	CO 1: Solar Systems and various coordinate systems
				CO 2: Effect of perturbation on satellite
				CO 3: Study of Satellite orbits
				CO 4: calculations of Missile trajectory
				CO 5: Satellite communication methods
40	III-II	AE602PC	Computational Aerodynamics	CO 1: Students will develop a better intuition of Aerodynamics more quickly than is possible with traditional analytical approaches.
				CO 2: Ability to undertake problem identification, formulation and solution and apply knowledge of
				CO 3: basic science and engineering fundamentals.
				CO 4: Developing a geometrical model of the flow, applying appropriate boundary conditions,
				CO 5: specifying solution parameters, and visualizing and analyzing the results.
41	III-II	AE603PC	Helicopter Aerodynamics	CO 1: Turbine efficiency
				CO 2: Helicopter blade configurations
				CO 3: Working principle of helicopter Types of helicopter
				CO 4: To understand the application and use of the FE method for Aerospace problems
				CO 5: To obtain an understanding of the fundamental theory of the FEA method
42	III-II	AE604PC	Aircraft Design	CO 1: Design of aircraft for various application, Effort estimation, Development life cycle
				CO 2: estimate its performance including handling qualities against given requirements.
				CO 3: Concept of boundary layer





				<p>CO 4: Basic fluid mechanics and description of fluid motion</p> <p>CO 5: Various equations to solve fluid dynamics problems</p>
43	III-II	AE605PC	Aerospace Propulsion Lab	<p>CO 1: To understand how to do the heat transfer analysis over the surface of the aircraft structure,</p> <p>CO 2: Study of different jet engines</p> <p>CO 3: Students understand design requirements of engine and aircraft.</p> <p>CO 4: Understand the performance aspects at the design point and off design operations.</p> <p>CO 5: Exposure with reference to numerical calculations and design limitations.</p>
44	III-II	AE606PC	CFD Lab	<p>CO 1: The ability to create models for trusses, frames, plate structures, machine parts, and components using ANSYS general-purpose software</p> <p>CO 2: To demonstrate the ability to evaluate and interpret FEA analysis results for design and evaluation purposes;</p> <p>CO 3: To develop a basic understanding of the limitations of the FE method and understand the possible error sources in its use.</p> <p>CO 4: To understand the application and use of the FE method for Aerospace problems</p> <p>CO 5: To obtain an understanding of the fundamental theory of the FEA method</p>
45	IV- II	AE703PC	Aircraft Engine Design	<p>CO 1: Working principle of IC engine, compressor</p> <p>CO 2: Turbine efficiency</p> <p>CO 3: Students understand design requirements of engine and aircraft.</p> <p>CO 4: Understand the performance aspects at the design point and off design operations.</p> <p>CO 5: an exposure with reference to numerical calculations and design limitations.</p>
46	IV- II	AE704PC	Particle Non Destructive Test for Material	<p>CO 1: To Understand Different type of testing</p> <p>CO 2: Principles of electronic measurement devices</p> <p>CO 3: various NDT Methods</p> <p>CO 4: Ultrasonic and particle testing methods</p> <p>CO 5: Visualizing and analyzing the results.</p>
47	IV- II	CE831OE	Environmental Impact Assessment	<p>CO 1: The Engineering graduate will understand /evaluate / develop technologies on the basis of Environment Impact Assessment.</p> <p>CO 2: Ecological principles and environmental</p>



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				regulations which in turn helps in sustainable development
				CO 3: the importance of ecological balance for sustainable development.
				CO 4: Understanding the impacts of developmental activities and mitigation measures.
				CO 5: the environmental policies and regulations

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CIVIL ENGINEERING			
PROGR AMME: CIVIL ENGIN EERIN G	DEGRE E: UG	A.Y: 2020-2021	SEMESTER: I&II
S.No	Year/ Sem	Course Name	Course Outcomes
			(Student can able to understand)
1	II- I	Surveying and Geomatics (CE301PC)	CO1: Apply the knowledge to calculate angles, distances and levels
			CO2: Identify data collection methods and prepare field notes
			CO3: Understand the working principles of survey instruments, measurement errors and corrective measures
			CO4: Relate the knowledge to the modern equipment and methodologies
			CO5: Estimate measurement errors and apply corrections, levels by different type of equipment
2	II- I	Engineering Geology (CE302PC)	CO1: Site characterization and how to collect, analyze, and report geologic data using standards in engineering practice
			CO2: To study and identify different types natural materials like rocks, minerals and soil
			CO3: The fundamentals of the engineering properties of Earth materials and fluids.
			CO4: To know the physical properties of rocks and minerals
			CO5: Rock mass characterization and the mechanics of planar rock slides and topples
3	II- I	Strength of Materials - I (CE303PC)	CO1: Describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, related to the strength of structured and mechanical components.
			CO2: Recognize various types loads applied on structural components of simple framing geometries and understand the nature of internal stresses that will develop within the components.
			CO3: To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading
			CO4: Analyze various situations involving structural members subjected to plane stresses by application of Mohr's circle of stress;





			CO5: Frame an idea to design a system, component, or process
4	II- I	Probability and Statistics (MA304BS)	CO1: Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.
			CO2: Formulate theorems about the concept of probability
			CO3: Calculate probabilities using conditional probability
			CO4: Rule of total probability and bayes theorem
			CO5: Explain the concept of a random variable and the probability distributions
5	II-I	Fluid Mechanics (CE305PC)	CO1: Understand the broad principles of fluid statics, kinematics and dynamics
			CO2: Understand definitions of the basic terms used in fluid mechanics and characteristics of fluids and its flow
			CO3: Understand classifications of fluid flow
			CO4: Be able to apply the continuity, momentum and energy principles
			CO5: Describe the physical properties of a fluid
6	II-I	Surveying Lab (CE306PC)	CO1: Appreciate the need for accurate and thorough note taking in field work to serve as a legal record
			CO2: Gain the ability to use modern survey equipment to measure angles and distances
			CO3: Gain a basic understanding of the principles and operation of the Global Positioning System
			CO4: Gain the ability to measure differences in elevation, draw and utilize contour plots, and calculate volumes for earthwork
			CO5: Improve ability to function as a member of a survey party in completing the assigned field work
7	II-I	Strength of materials lab (CE307PC)	CO1: Configure & Operate a data acquisition system using various testing machines of solid materials
			CO2: Compute and Analyze engineering values (e.g. stress or strain) from laboratory measurements.
			CO3: Write a technical laboratory report
			CO4: Determine hardness of metals
			CO5: Conduct tension test on Materials like steel etc.
8	II-I	Engineering geology lab(CE308PC)	CO1: Understands the method and ways of investigations required for Civil Engg projects
			CO2: Identify the various rocks, minerals depending on geological classifications
			CO3: Will able to learn to couple geologic expertise with the engineering properties of rock and





			unconsolidated materials
			CO4: In the characterization of geologic sites for civil work projects and the quantification of processes such as rock slides and settlement.
			CO5: Write a technical laboratory report
9	II-I	Constitution of India (MC309)	CO1: Understand the emergence and evolution of Indian constitution.
			CO2: Understand the structure and composition of Indian constitution.
			CO3: Understand and analyse federalism in the Indian context.
			CO4: Understand and analyse the three organs of the state in the contemporary scenario.
			CO5: Understand and evaluate the Indian political scenario amidst the emerging challenges.
9	III-I	Structural Analysis-II (CE501)	CO1: Analyze the two hinged arches.
			CO2: Solve statically indeterminate beams and portal frames using classical methods
			CO3: Sketch the shear force and bending moment diagrams for indeterminate structures.
			CO4: Formulate the stiffness matrix and analyze the beams by matrix methods
			CO5: to impart the principles of elastic structural analysis and behaviour of indeterminate structures
10	III-I	Geotechnical Engineering (CE502PC)	CO1: Characterize and classify the soils
			CO2: Able to estimate seepage, stresses under various loading conditions and compaction characteristics
			CO3: Able to analyse the compressibility of the soils
			CO4: Able to understand the strength of soils under various drainage conditions
			CO5: problems of liquefaction and soil improvement
11	III-I	Structural Engineering –I (RCC) (CE503PC)	CO1: Compare and Design the singly reinforced, doubly reinforced and flanged sections.
			CO2: Design the axially loaded, uniaxial and biaxial bending columns.
			CO3: Classify the footings and Design the isolated square, rectangular and circular footings
			CO4: Distinguish and Design the one-way and two-way slabs.
			CO5: Identify and calculate the design loads and distribution
12	III-I	Transportation Engineering (CE504PC)	CO1: An ability to apply the knowledge of mathematics, science and engineering in the areas of traffic engineering, highway development and maintenance





			<p>CO2: An ability to design, conduct experiments to assess the suitability of the highway materials like soil, bitumen, aggregates and a variety of bituminous mixtures. Also the students will develop the ability to interpret the results and assess the suitability of these materials for construction of highways.</p> <p>CO3: An ability to design flexible and rigid highway pavements for varying traffic compositions as well as soil subgrade and environmental conditions using the standards stipulated by Indian Roads Congress.</p> <p>CO4: An ability to evaluate the structural and functional conditions of in-service highway pavements and provide solution in the form of routine maintenance measures or designed overlays using Indian Roads congress guidelines.</p> <p>CO5: An ability to assess the issues related to road traffic and provide engineering solutions supported with an understanding of road user psychological and behavioural patterns.</p>
13	III-I	<p align="center">Concrete Technology (Professional Elective-I) (CE511PE)</p>	<p>CO1: Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting different tests. Recognize the effects of the rheology and early age properties of concrete on its long-term behavior.</p> <p>CO2: Apply the use of various chemical admixtures and mineral additives to design cement-based materials with tailor-made properties</p> <p>CO3: Use advanced laboratory techniques to characterize cement-based materials.</p> <p>CO4: Perform mix design and engineering properties of special concretes such as high-performance concrete, self-compacting concrete, and fibre reinforced concrete.</p> <p>CO5: Recognize the effects of the rheology and early age properties of concrete on its long-term behavior.</p>
14	III-I	<p align="center">Engineering Economics and Accountancy (SM505MS)</p>	<p>CO1: To perform and evaluate present and future worth of the alternate projects and to appraise projects by using traditional and DCF Methods</p> <p>CO2: To carry out cost benefit analysis of projects and to calculate BEP of different alternative projects.</p> <p>CO3: Understand the market structures and integration concepts</p> <p>CO4: Apply the concepts of financial management for project appraisal</p> <p>CO5: Evaluate the economic theories, cost concepts and pricing policies</p>
15	III-I	<p align="center">Highway Engineering & Concrete technology</p>	<p>CO1: Categorize the test on materials used Civil Engineering Building & Pavement constructions</p>





		Lab (CE506PC)	<p>CO2:To perform the tests on concrete for it characterization</p> <p>CO3:To Design Concrete Mix Proportioning by Using Indian Standard Method.</p> <p>CO4:Examine the tests performed for Bitumen mixes</p> <p>CO5:To prepare a laboratory report</p>
16	III-I	Advance Communication Skills Lab (EN508HS)	<p>CO1:Communicate efficiently in the work place up professional context</p> <p>CO2:Accomplishment of sound vocabulary and its proper use contextually.</p> <p>CO3:Flair in Writing and felicity in written expression.</p> <p>CO4:Enhanced job prospects.</p> <p>CO5:Effective Speaking Abilities</p>
17	III-I	Geotechnical Engineering Lab(CE507PC)	<p>CO1:Carry out soil mechanics fundamental experiments according to IS standards</p> <p>CO2:Collect, analyze and interpret experimental data</p> <p>CO3:Design soil mechanics experiments and determine which test is needed.</p> <p>CO4:Designing civil engineering projects</p> <p>CO5:Use communication skills to transfer their findings in a formal report format</p>
18	III-I	Intellectual Property Rights(*MC509)	<p>CO1:Distinguish and explain various forms of IPRs.</p> <p>CO2: Identify criterias to fit ones own intellectual work in particular form of IPRs.</p> <p>CO3:Apply statutory provisions to protect particular form of IPRs.</p> <p>CO4:Develop skill of making search using modern tools and technics</p> <p>CO5:Identify procedure to protect different forms of IPRs national and international level.</p>
19	IV- I	Transportation Engineering(CE701PC)	<p>CO1: Understand Plan highway networks</p> <p>CO2: Design highway geometrics.</p> <p>CO3: Design Intersections and prepare traffic management plans.</p> <p>CO4: Design flexible and rigid pavements.</p> <p>CO5: Carry out surveys involved in planning and highway alignment</p>
20	IV-I	Estimation Quantity Surveying and Valuation (CE702PC)	<p>CO1: Do estimation of Buildings, Roads and Canals.</p> <p>CO2: Understand contracts and specification.</p>





			<p>CO3: The student will be getting knowledge an contracts and tenders</p> <p>CO4: Assess the valuation of buildings</p> <p>CO5: provide practical knowledge of standard specifications</p>
21	IV-I	<p>Rehabilitaion and Retrofitting of Structures (Professional Elective - II) (CE724PE)</p>	<p>CO1: Develop various maintenance and repair strategies.</p> <p>CO2: Evaluate the existing buildings through field investigations.</p> <p>CO3: Understand and use the different techniques for structural retrofitting</p> <p>CO4: Understand the properties of fresh and hardened concrete</p> <p>CO5: Get an idea of repair techniques</p>
22	IV-I	<p>Watershed Management (Professional Elective - III) (CE731PE)</p>	<p>CO1: Identify causes of soil erosion</p> <p>CO2: Plan and design soil conservation measures in a watershed</p> <p>CO3: Plan and design water harvesting and groundwater recharge structures</p> <p>CO4: Plan measures for reclamation of saline soils</p> <p>CO5: Understanding the concept of watershed management and its effects and land ,water and ecosystem resources</p>
23	IV-I	<p>Irrigation and Hydraulic Structures (Professional Elective - IV) (CE744PE)</p>	<p>CO1: Plan an Irrigation System</p> <p>CO2: Design irrigation canals and canal network</p> <p>CO3: Plan and design diversion head works</p> <p>CO4: Design irrigation canal structures</p> <p>CO5: Analyze gravity and earth dams</p> <p>CO6: Design spillways and energy dissipations works</p> <p>CO7: Analyze and design gravity dams</p>
24	II-II	<p>Basic Electrical and Electronics Engineering (EE401ES)</p>	<p>CO1: To analyze and solve electrical circuits using network laws and theorems</p> <p>CO2: To understand and analyze basic Electric and Magnetic circuits</p> <p>CO3: To study the working principles of Electrical Machines</p> <p>CO4: To introduce components of Low Voltage Electrical Installations.</p> <p>CO5: To identify and characterize diodes and various types of transistors.</p>
25	II-II	<p>Basic Mechanical Engineering for Civil</p>	<p>CO1: To understand the mechanical equipment for the usage at civil engineering systems,</p>





		Engineers (CE402ES)	<p>CO2: To familiarize with the general principles and requirement for refrigeration, manufacturing,</p> <p>CO3: To realize the techniques employed to construct civil engineering systems.</p> <p>CO4: The knowledge of construction equipments practices and techniques to be used in the field</p> <p>CO5: Be able to apply theoretical and practical aspects of project management techniques to achieve project goals</p>
26	II-II	Building Materials, Construction and Planning (CE403PC)	<p>CO1: Define the Basic terminology that is used in the industry</p> <p>CO2: Categorize different building materials, properties and their uses</p> <p>CO3: Understand the Prevention of damage measures and good workmanship</p> <p>CO4: Explain different building services</p> <p>CO5: Study the prevalent building by laws</p>
27	II-II	Strength of Materials - II (CE404PC)	<p>CO1: Describe the concepts and principles, understand the theory of elasticity, and perform calculations, relative to the strength of structures and mechanical components in particular to torsion and direct compression;</p> <p>CO2: To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading</p> <p>CO3: Analyze strength and stability of structural members subjected to Direct, and Direct and Bending stresses;</p> <p>CO4: Understand and evaluate the shear center and unsymmetrical bending.</p> <p>CO5: Frame an idea to design a system, component, or process</p>
28	II-II	Hydraulics and Hydraulic Machinery (CE405PC)	<p>CO1: Apply their knowledge of fluid mechanics in addressing problems in open channels and hydraulic machinery.</p> <p>CO2: Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions.</p> <p>CO3: Apply dimensional analysis and to differentiate the model, prototype and similitude conditions for practical problems.</p> <p>CO4: Get the knowledge on different hydraulic machinery devices and its principles.</p> <p>CO5: That will be utilized in hydropower development and for other practical usages.</p>
29	II-II	Structural Analysis - I (CE406PC)	<p>CO1: Differentiate the statically determinate and indeterminate structures.</p>





			<p>CO2: To understand the nature of stresses developed in perfect frames and three hinged arches for various types of simple loads</p> <p>CO3: Analyse the statically indeterminate members such as fixed bars, continuous beams and for various types of loading.</p> <p>CO4: Understand the energy methods used to derive the equations to solve engineering problems</p> <p>CO5: Evaluate the Influence on a beam for different static & moving loading positions</p>
30	II-II	Computer aided Civil Engineering Drawing(CE407PC)	<p>CO1:Use the Autocad commands for drawing 2D & 3D building drawings required for different civil engg applications.</p> <p>CO2:Plan and draw Civil Engineering Buildings as per aspect and orientation.</p> <p>CO3:Presenting drawings as per user requirements and preparation of technical report</p> <p>CO4:Introduction to computer aided drafting, Software for CAD – Introduction to different softwares, Practice exercises on CAD software</p> <p>CO5:Drawing of plans of buildings using software a) Single storied buildings b) multi storied buildings</p>
31	II-II	Hydraulics and Hydraulic Machinery Lab (CE409PC)	<p>CO1:Describe the basic measurement techniques of fluid mechanics and its appropriate application.</p> <p>CO2:Interpret the results obtained in the laboratory for various experiments.</p> <p>CO3:Discover the practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.</p> <p>CO4:Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions.</p> <p>CO5:Ability to select hydraulic turbines for hydropower plants.</p>
32	II-II	Basic Electrical and Electronics Engineering Lab(EE409ES)	<p>CO1:To analyze and solve electrical circuits using network laws and theorems.</p> <p>CO2:To understand and analyze basic Electric and Magnetic circuits</p> <p>CO3:To study the working principles of Electrical Machines.</p> <p>CO4:To introduce components of Low Voltage Electrical Installations</p> <p>CO5:To identify and characterize diodes and various types of transistors.</p>
33	II-II	Gender Sensitization Lab(*MC409)	<p>CO1:Students will have developed a better understanding of important issues related to gender in contemporary India.</p>





			<p>CO2: Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.</p> <p>CO3: Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.</p> <p>CO4: Students will acquire insight into the gendered division of labour and its relation to politics and economics.</p> <p>CO5: Men and women students and professionals will be better equipped to work and live together as equals.</p>
34	III-II	Hydrology & Water Resources Engineering (CE601PC)	<p>CO1: Understand the different concepts and terms used in engineering hydrology</p> <p>CO2: To identify and explain various formulae used in estimation of surface and Ground water hydrology components</p> <p>CO3: Demonstrate their knowledge to connect hydrology to the field requirement</p> <p>CO4: Analyze the design of canals by using different methods</p> <p>CO5: Learn the concept of ground water and its occurrence</p>
35	III-II	Environmental Engineering (CE602PC)	<p>CO1: Assess characteristics of water and wastewater and their impacts</p> <p>CO2: Estimate quantities of water and waste water and plan conveyance components</p> <p>CO3: Design components of water and waste water treatment plants</p> <p>CO4: Be conversant with issues of air pollution and control</p> <p>CO5: Design sewerage system</p>
36	III-II	Foundation Engineering (CE603PC)	<p>CO1: understand the principles and methods of Geotechnical Exploration</p> <p>CO2: decide the suitability of soils and check the stability of slopes</p> <p>CO3: calculate lateral earth pressures and check the stability of retaining walls</p> <p>CO4: analyse and design the shallow and deep foundations</p> <p>CO5: Understand soil exploration methods</p>
37	III-II	Structural Engineering –II (Steel) (CE604PC)	<p>CO1: Analyze the tension members, compression members.</p> <p>CO2: Design the tension members, compression members and column bases and joints and connections</p> <p>CO3: Analyze and Design the beams including built-</p>





			up sections and beam and connections
			CO4: Identify and Design the various components of welded plate girder including stiffeners
			CO5: Design bolt and weld connections
38	III-II	Prestressed Concrete Structures (Professional Elective –II) (CE611PE)	CO1: Acquire the knowledge of evolution of process of prestressing
			CO2: Acquire the knowledge of various prestressing techniques.
			CO3: Develop skills in analysis design of prestressed structural elements as per the IS codal provisions
			CO4: Estimate losses of pre stressing
			CO5: Analyse a pre stressed concrete section
39	III-II	Renewable Energy Sources (Open Elective – I) (EE601OE)	CO1: Understand the principals of wind power
			CO2: Assess the cost of generation for conventional and renewable energy plants.
			CO3: Design suitable power controller for wind and solar applications.
			CO4: Analyze the issues involed in the integration of renewable energy sources to the grid.
			CO5: Understand the solar photovoltaic power generation, fuel cells.
40	III-II	ENVIRONMENTAL ENGINEERING LAB (CE605PC)	CO1: Understand about the equipment used to conduct the test procedures
			CO2: Perform the experiments in the lab
			CO3: Examine and Estimate water, waste water, air and soil Quality
			CO4: Compare the water, air quality standards with prescribed standards set by the local governments
			CO5: Develop a report on the quality aspect of the environment
41	III-II	COMPUTER AIDED DESIGN LAB (CE606PC)	CO1: Model the geometry of real-world structure Represent the physical model of structural element/structure
			CO2: Perform analysis
			CO3: Interpret from the Post processing results
			CO4: Design the structural elements and a system as per IS Codes
			CO5: Apply basic concepts to develop construction (drawing) techniques and Ability to manipulate drawings through editing and plotting techniques
42	III-II	ENVIRONMENTAL SCIENCE (MC609)	CO1: Based on this course, the Engineering graduate will understand /evaluate
			CO2: Develop technologies on the basis of ecological principles.





			<p>CO3:Environmental regulations which in turn helps in sustainable development</p> <p>CO4:Sustainable developmental activities</p> <p>CO5:Environmental policies and regulations, awareness.</p>
43	IV-II	Organizational Behaviour (Open Elective –III) (EE833OE)	<p>CO1: Analyze the behaviour of individuals and groups in organizations in terms of the key factors that influence organizational behaviour.</p> <p>CO2: Assess the potential effects of organizational level factors (such as structure, culture and change) on organizational behaviour.</p> <p>CO3: Critically evaluate the potential effects of important development in the external environment (such as globalization and advances in technology) on organizational behaviour.</p> <p>CO4: Analyze organizational behaviour issues in the context of organizational behaviour theories, models and concepts.</p> <p>CO5: To explain group dynamics and demonstrate skills required for working in groups</p>
44	IV-II	Waste Management(Professional Elective – V) (CE851PE)	<p>CO1: Identify the physical and chemical composition of wastes</p> <p>CO2: Analyze the functional elements for solid waste management.</p> <p>CO3: Analyze the functional elements for liquid waste management</p> <p>CO4: To Understand the effluent treatment Plants and its disposal</p> <p>CO5: Beginning from source generation to waste disposal in a system of municipality organizational structure</p>
45	IV-II	Industrial waste water treatment (Professional Elective –I) (CE864PE)	<p>CO1: Identify the characteristics of industrial wastewaters</p> <p>CO2: Describe pollution effects of disposal of industrial effluent</p> <p>CO3: Identify and design treatment options for industrial wastewater</p> <p>CO4:Describe the design criteria and waste water treatment systems for rural areas</p> <p>CO5: Formulate environmental management plan</p>





COMPUTER SCIENCE & ENGINEERING

Program : B.Tech- Computer Science & Engineering			Academic Year : 2020-21	Semester : I & II
S.No	Year /Sem	Course Code	Course Name	Course Outcomes
1	II/I	CS301ES	Analog and Digital Electronics	CO 1: Acquire knowledge of electrical characteristics of ideal and practical diodes under forward and reverse bias to analyze and design diode application circuits such as rectifiers.
				CO 2: Utilize operational principles of bipolar to derive appropriate small-signal models and use them for the analysis of basic circuits.
				CO 3: Understand the basic concept of number systems, Boolean algebra principles.
				CO 4: Understand minimization techniques for Boolean algebra.
				CO 5: Analyze Combination logic circuit such as multiplexers, adders, decoders.
2	II/I	CS302PC	Data Structures	CO 1: Choose appropriate data structures to represent data items.
				CO 2: Analyze the time and space complexities of algorithms.
				CO 3: Design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs and B-trees.
				CO 4: Analyze and implement various kinds of searching and sorting methods.
				CO 5: Describe how arrays, linked structures, stacks, queues, trees, and graphs are represented in memory.
3	II/I	MA303BS	Computer Oriented Statistical Methods	CO 1: Describe the conditional probability and state the Baye's theorem and solve its applications.
				CO 2: Solve the problems on random variables and compare the difference between probability distributions.
				CO 3: Construct the area of normal curve and distinguish binominal, gamma and exponential distributions.
				CO 4: Formulate the sampling distribution of





				means and sampling distribution of variances. CO 5: Classify the methods of estimations and errors of estimations.
4	II/I	CS304PC	Computer Organization and Architecture	<p>CO 1: Describe basics of computer organization and register transfer languages and micro operations such as arithmetic, logic, shift micro operations.</p> <p>CO 2: Explain about computer instructions, computer registers and instruction cycle and interrupt cycle.</p> <p>CO 3: Describe the design of control unit with address sequencing and microprogramming concept and CPU with instruction formats, addressing modes and types of instructions such as data transfer, manipulation and program control.</p> <p>CO 4: Describe various data representations and explain how arithmetic operations are performed by computer.</p> <p>CO 5: Illustrate the concepts of Input-Output Organization and Memory Organization.</p>
5	II/I	CS305PC	Object Oriented Programming using C++	<p>CO 1: Develop application for a range of problem using object oriented programming concepts.</p> <p>CO 2: Construct programs on various methodology using class and object.</p> <p>CO 3: Illustrate the different forms of inheritance.</p> <p>CO 4: Construct and develop programs with reusability using polymorphism and virtual function.</p> <p>CO 5: Develop programs for file handling.</p>
6	II/I	CS306ES	Analog & Digital Electronics Lab	<p>CO 1: Know the characteristics of various components.</p> <p>CO 2: Understand the utilization of components.</p> <p>CO 3: Design and analyze small signal amplifier circuits.</p> <p>CO 4: Postulates of Boolean algebra and to minimize combinational functions.</p> <p>CO 5: Design and analyze combinational and sequential circuits.</p>
7	II/I	CS307PC	Data Structures Lab	CO 1: Summarize different categories of data Structures.





				<p>CO 2: Analyze the performance of an algorithm.</p> <p>CO 3: Develop C programs for computing control statements.</p> <p>CO 4: Understand C programs for computing arrays, functions, pointers, strings.</p> <p>CO 5: Understand stacks, queues and linked lists.</p>
8	II/I	CS308PC	IT Workshop Lab	<p>CO 1: Identify the parts of CPU and able to learn knowledge for computer assembling and disassembling.</p> <p>CO 2: Resolve the Software installation.</p> <p>CO 3: Ability to solve the trouble shooting problems.</p> <p>CO 4: Apply the techniques and netiquettes while using internet.</p> <p>CO 5: Model a web page by using HTML</p>
9	II/I	CS309PC	C++ Programming Lab	<p>CO 1: Identify and able to develop applications for a range of problems on operators such as scope resolution and new delete memory allocation.</p> <p>CO 2: Write a basic concepts on initializing and displaying contents of class member and structure of class.</p> <p>CO 3: Develop basic programs on inheritance.</p> <p>CO 4: Identify and able to do programs to use pointer for both base and derived classes and call the member function by using Virtual keyword.</p> <p>CO 5: Develop basic programs on console i/o operations.</p>
10	II/I	MC309	Gender Sensitization Lab	<p>CO 1: Develop sensibility with regard to issues of gender in contemporary India.</p> <p>CO 2: Provide a critical perspective on the socialization of men and women.</p> <p>CO 3: Determine information about some key biological aspects of genders.</p> <p>CO 4: Debate on the politics and economics of work.</p> <p>CO 5: Reflect critically on gender violence.</p>
11	II/II	CS401PC	Discrete Mathematics	<p>CO 1: Understand and construct precise mathematical proofs.</p> <p>CO 2: Use logic and set theory to formulate precise statements.</p> <p>CO 3: Analyze and solve counting problems</p>





				on finite and discrete structures.
				CO 4: Describe and manipulate sequences.
				CO 5: Apply graph theory in solving computing problems.
12	II/II	SM402MS	Business Economics & Financial Analysis	CO 1: The students will understand various forms of Business and the impact of economic variables on the business.
				CO 2: Understand the significance of elasticity of demand and its forecasting, law of demand and its exceptions and supply analysis.
				CO 3: Understand production analysis function with different variables and cost analysis functions.
				CO 4: To adopt the principles of accounting to record, classify and summarize various transactions in books of accounts for preparation of final accounts.
				CO 5: Understand the Ratio analysis to give an idea about financial forecasting, financial planning, controlling and decision making.
13	II/II	CS403PC	Operating Systems	CO 1: Describe operating system goals and functions.
				CO 2: Get the knowledge of process, various CPU scheduling algorithms and synchronization.
				CO 3: Analyze the methods for handling deadlocks.
				CO 4: Understand the memory management and several page replacement algorithms.
				CO 5: Classify the storage management and file system implementation.
14	II/II	CS404PC	Database Management Systems	CO1: Identify and understand the underlying concepts of database techniques and query a database using DML/DDL commands and able to design entity relationship diagrams.
				CO 2: Explain the concepts of relational data model, entity- relationship model and relational database design.
				CO 3: Apply relational algebra and calculus, understands the use of sql and learns sql syntax.
				CO 4: Develop and improve database





				design by normalization.
				CO 5: Define transaction and understand its properties. Learns techniques for controlling the consequences of concurrent data access.
15	II/II	CS405PC	Java Programming	CO 1: Analyze Object Oriented Programming Concepts.
				CO 2: Develop the Abstract Classes and know the importance of the Inheritance, Encapsulation and Polymorphism.
				CO 3: Implementing interfaces and creating packages and create files and directories using g Java I/O Streams.
				CO 4: Get the importance of Exception handling and knowledge of multithreading and java collection classes concepts.
				CO 5: Design web applications by using applets and swings.
16	II/II	CS406PC	Operating Systems Lab	CO 1: Develop programs on CPU scheduling algorithms.
				CO 2: Construct the programs on file organisation and file allocation techniques.
				CO 3: Solve deadlock avoidance and deadlock prevention using Bankers' algorithm.
				CO 4: Classify and construct programs on memory management techniques.
				CO 5: Develop application programs using system calls.
17	II/II	CS406PC	Database Management Systems Lab	CO 1: Identify and understand the underlying relational data model, entity-relationship model and relational database design.
				CO 2: Develop and improve database design by normalization.
				CO 3: Identify and understand the underlying concepts of database techniques and query a database using DML/DDI commands.
				CO 4: Identify and understands the use of sql and learns sql syntax of set difference operators and joins.
				CO 5: Write basic database query using Aggregate operators.
18	II/II	CS408PC	Java Programming Lab	CO 1: Construct the programs for Abstract classes, Inheritance and Interface.
				CO 2: Write the program for Multithreading





				and Files operations.
				CO 3: Prepare the programs for applets.
				CO 4: Develop the basic applications by using Swing components.
				CO 5: Construct the programs for collection Framework.
19	II/II	MC409	Constitution of India	CO 1: Understand meaning, features, characteristics of constitution law and constitutionalism.
				CO 2: Describe fundamental rights, fundamental duties and its legal status.
				CO 3: Describe The constitution powers and status of the President of India.
				CO 4: Understand Emergency Provisions: National Emergency, President Rule, And Financial Emergency.
				CO 5: Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19.
20	III/I	CS501PC	Formal Languages and Automata Theory	CO 1: Able to understand the concept of abstract machines and their power to recognize the languages.
				CO 2: Able to employ finite state machines for modeling and solving computing problems.
				CO 3: Able to design context free grammars for formal languages.
				CO 4: Able to distinguish between decidability and undecidability.
				CO 5: Able to gain proficiency with mathematical tools and formal methods.
21	III/I	CS502PC	Software Engineering	CO 1: Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document.
				CO 2: Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
				CO 3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report.
				CO4: Compare Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM





				plan CO5: Contrast Creating an architectural design: software architecture, data design, architectural styles and patterns.
22	III/I	CS503PC	Computer Networks	CO1: Gain the knowledge of the basic computer network technology CO2: Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model. CO 3: Obtain the skills of subnetting and routing mechanisms. CO 4: Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation CO 5:: Analyze the data link layer protocols by Analyse
23	III/I	CS504PC	Web Technologies	CO 1: gain knowledge of client-side scripting, validation of forms and AJAX programming CO 2: understand server-side scripting with PHP language CO 3: understand what is XML and how to parse and use XML Data with Java CO 4: To introduce Server-side programming with Java Servlets and JSP CO 5: Use XAMP Stack for web applications
24	III/I	CS511PE	Informational Retrieval System	CO 1: Learn measurement of information and errors CO 2: Understand the significance of codes in various applications CO 3: Obtain knowledge in designing various source codes and channel codes CO 4: Contrast applications of block codes for Error control in data storage system CO 5: Explain Structural and Distance Properties, state, tree, trellis diagrams, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes
25	III/I	CS515PE	Principles of Programming Languages	CO 1: Compare different Programming Domains CO 2: Choose Specific Programming Language for the Development of Specific Applications CO 3: Acquire the skills for expressing syntax and semantics in formal notation CO4: Identify and apply a suitable programming paradigm for a given computing application CO5: Gain knowledge of and able to compare the





				features of various programming languages
26	III/I	CS523PE	Informational Retrieval System	CO 1: Ability to apply IR principles to locate relevant information large collections of data
				CO 2: Design an Information Retrieval System for web search tasks.
				CO 3: Implement retrieval systems for web search tasks
				CO 4: Ability to design different document clustering algorithms
				CO 5: Explain text search techniques software text search algorithms and hardware text search systems
27	III/I	CS505PC	Software Engineering Lab	CO 1: Ability to translate end-user requirements into system and software requirements
				CO 2: Ability to generate a high-level design of the system from the software requirements
				CO 3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
				CO 4: Understand the software engineering methodologies involved in the phases for project
				CO 5: Exercise developing product-start-ups
28	III/I	CS506PC	Computer Networks And Web Technologies Lab	CO 1: Implement and analyze routing and congestion issues in network design.
				CO 2: Implement Encoding and Decoding techniques used in presentation layer
				CO 3: Implement data link layer framing methods
				CO 4: To be able to work with different network tools
				CO 5: Compare and implement various kinds of encryption and decryption techniques.
29	III/II	CS601PC	Machine Learning	CO 1: Understand the concepts of computational intelligence like machine learning
				CO 2: Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
				CO 3: Understand the Neural Networks and its usage in machine learning application.
				CO 4: Illustrate the Motivation, estimation hypothesis accuracy, basics of sampling theory, a general approach for deriving confidence intervals, difference in error of two hypotheses,





				<p>comparing learning algorithms.</p> <p>CO 5: Ability to neural network representation, appropriate problems for neural network learning, perceptions, multilayer networks and the back-propagation algorithm.</p>
30	III/II	CS602PC	Compiler Design	<p>CO 1: Describe structure of a compiler and basics of programming languages.</p> <p>CO 2: Design Lexical analyzer generator by using regular expressions and finite automata.</p> <p>CO 3: Design and implement LL and LR parsers and use</p> <p>CO 4: Identify the storage organization used to support the run-time environment of a program and effectively</p> <p>CO 5: Demonstrate the ability to design a compiler given a set of language features.</p>
31	III/II	CS603PC	Design And Analysis Of Algorithms	<p>CO 1: Analyze the Performance of an Algorithm.</p> <p>CO 2: Solve the problems using divide and conquer approach.</p> <p>CO 3: Develop constraint satisfied solutions using</p> <p>CO 4: Evaluate feasible solutions using Greedy method.</p> <p>CO 5: Developing solutions to problems using dynamic</p>
32	III/II	CS613PE	Scripting Languages	<p>CO 1: Comprehend the differences between typical scripting languages and typical system and application programming languages.</p> <p>CO 2: Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.</p> <p>CO 3: Acquire programming skills in scripting language</p> <p>CO 4: Develop the web applications master and understanding of python especially the object oriented</p> <p>CO 5: Illustrate the principles of linux networking in Linux RHEL6/7/ubuntu operating systems.</p>
33	III/II	MC609	Environmental Science	<p>CO 1: Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn</p>





				<p>helps in sustainable development</p> <p>CO 2: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems</p> <p>CO 3: Scope and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids</p> <p>CO4: Explain genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values</p> <p>CO5: Illustrate the Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management</p>
34	III/II	CS604PC	Machine Learning Lab	<p>CO 1: understand complexity of Machine Learning algorithms and their limitations;</p> <p>CO 2: understand modern notions in data analysis-oriented computing;</p> <p>CO 3: be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;</p> <p>CO 4: Be capable of performing experiments in Machine Learning using real-world data.</p> <p>CO 5: Design application using TCL/TK scripts for</p>
35	III/II	CS623PE	Scripting Languages Lab	<p>CO 1: Ability to understand the differences between Scripting languages and programming languages</p> <p>CO 2: Able to gain some fluency programming in Ruby, Perl, TCL</p> <p>CO 3: Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby Type System, Embedding Ruby to Other Languages, Embedding a Ruby Interpreter</p> <p>CO 4: Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages</p> <p>CO 5: Illustrate the Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk</p>
36	IV/I	137BQ	Data Mining	<p>CO 1: Analyze various data base techniques</p>





				<p>for data warehouse and able to perform OLAP Operations.</p> <p>CO 2: Ability to perform the Pre-processing of data and apply mining techniques on data.</p> <p>CO 3: Understand frequent set and apply association Rule on Data Set.</p> <p>CO 4: Evaluate the data mining ask like Classification, Regression Clustering on large data set.</p> <p>CO 5: Ability to solve real world Problems in business and scientific information using data mining.</p>
37	IV/I	137GA	Principles of Programming Languages	<p>CO 1: Express the important features of the Programming Languages.</p> <p>CO 2: Develop the skills for expressing syntax and semantics in formal notation.</p> <p>CO 3: Compare different Programming Domains.</p> <p>CO 4: Choose Specific Programming Language for the Development of Specific Applications.</p> <p>CO 5: Analyze the Importance of Implementation Process.</p>
38	IV/I	137GD	Python Programming	<p>CO 1: Examine python syntax and semantics and be fluent in the use of python flow control and functions.</p> <p>CO 2: Demonstrate proficiency in handling strings and file systems.</p> <p>CO 3: Create run and manipulate python programs using core data structures like lists, dictionaries and use regular expressions.</p> <p>CO 4: Interpret the concepts of object oriented programming as used in python.</p> <p>CO 5: Recognize exemplary applications related to network programming and web services.</p>
39	IV/I	137HB	SOFTWARE PROCESS AND PROJECT MANAGEMENT	<p>CO 1: Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation</p> <p>CO 2: Analyze the major and minor milestones, artifacts and metrics from management and technical perspective</p> <p>CO 3: Design and develop software product using conventional and modern principles of software project management</p>





				<p>CO 4: Illustrate The seven-core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.</p> <p>CO 5: Explain Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments.</p>
40	IV/I	137BC	Cloud Computing	<p>CO 1: Distinguish different types of Distributed System models and enabling technologies.</p> <p>CO 2: Ability to perform four cloud deployment models.</p> <p>CO 3: Ability to manage cloud applications, migrate applications to cloud.</p> <p>CO 4: Explore the Iaas service providers, Paas, Saas service providers.</p> <p>CO 5: Originates and manage applications on Amazon Web Services cloud.</p>
41	IV/I	13707	Data Mining Lab	<p>CO 1: Add mining algorithms as a component to the exiting tools.</p> <p>CO 2: Apply mining techniques for realistic data.</p> <p>CO3: Perform the Pre-processing of data and apply mining techniques on data.</p> <p>CO4: Understand frequent set and apply association Rule on Data Set.</p> <p>CO5: Evaluate the data mining ask like Classification, Regression Clustering on large data set.</p>
42	IV/I	13730	Python Programming Lab	<p>CO 1: Student should be able to understand the basic concepts scripting and the Contributions of scripting language.</p> <p>CO 2: Ability to explore python especially the object oriented concepts, and the built in Objects of Python.</p> <p>CO 3: Understand the concept of modules in python script.</p> <p>CO 4: Handling the files using python.</p> <p>CO 5: Ability to create practical and contemporary applications such as Web applications.</p>
43	IV/I	13737	Industry Oriented Mini Project	<p>CO 1: Apply fundamental concepts and methods of their engineering field.</p> <p>CO 2: Use effectively oral, written and visual communication.</p> <p>CO 3: Understand working with teams.</p>





44	IV/I	13767	Seminar	CO 1: Understand advanced research methodologies in the field of computer science engineering.
				CO 2: Demonstrate their understanding of discussions and spark further discussion.
				CO 3: Identify understand and discuss current issues in the engineering field.
45	IV/II	138DK	Modern Software Engineering	CO 1: To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases
				CO 2: To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.
				CO 3: a solid understanding to the methods of modern software engineering
				CO 4: the ability to build and configure major operating system components
46	IV/II	138BE	Computer Forensics	CO 1: Understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
				CO 2: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.
				CO 3: understanding acquisition procedures for cell phones and mobile devices.
				CO 4: Able to evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software E-Mail Investigations:
				CO 5: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene
47	IV/II	138GW	RENEWABLE ENERGY SOURCES	CO 1: Understanding of renewable energy sources
				CO 2: Knowledge of working principle of various energy systems





				<p>CO 3: Capability to carry out basic design of renewable energy systems</p> <p>CO 4: Understand the principles of wind power and solar photovoltaic power generation, fuel cells.</p> <p>CO 5 : Analyze the issues involved in the integration of renewable energy sources to the grid.</p>
48	IV-II	13805	Major Project	<p>CO 1: Analyze engineering problems, identify an appropriate solution, implement the methodology and propose a meaningful solution.</p> <p>CO 2: Develop confidence for self-education and ability for lifelong learning.</p> <p>CO 3: Plan, analyze, design a software project and demonstrate the ability</p> <p>CO 4: Introduce with major software engineering topics and position them</p> <p>CO5: Learn to work as a team and to focus on getting a working project done within a stipulated period of time.</p>

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ELECTRONICS & COMMUNICATION ENGINEERING

ELECTRONICS & COMMUNICATION ENGINEERING			
PROGRAME:EC E	DEGREE : UG	A. Y: 2020-21	Course Outcomes
S.No	Year/ Sem	Course Name	
1	II-I	EC301PC- Electronic Devices & Circuits	CO1: Students will be able to Know the characteristics of various components.
			CO2: Students will be able to Understand the utilization of components.
			CO3: Students will be able to Understand the biasing techniques.
			CO4: Students will be able to Design and analyze small signal amplifier circuits.
			CO5 : Students will be able to classify between different Amplifiers and evaluate their efficiency
2	II-I	EC302PC- Network Analysis & Transmission Lines	CO1: Students will be able to Gain the knowledge on basic RLC circuits behavior.
			CO2: Students will be able to Analyze the Steady state and transient analysis of RLC Circuits.
			CO3: Students will be able to Know the characteristics of two port network parameters.
			CO4: Students will be able to Analyze the transmission line parameters and configurations.
			CO5: Students will be able to Know the Functioning of smitch chart
3	II-I	EC303PC- Digital System Design	CO1: Students will be able to Understand the numerical information in different forms and Boolean Algebra theorems.
			CO2: Students will be able to Postulates of Boolean algebra and to minimize





			combinational functions
			CO3: Students will be able to Design and analyze combinational and sequential circuits
			CO4: Students will be able to Known about the logic families and realization of logic gates.
			CO5: Students will be able to know various Logic Families in Digital Electronics
4	II-I	EC304PC- Signals & Systems	CO1: Students will be able to Differentiate various signal functions.
			CO2: Students will be able to Represent any arbitrary signal in time and frequency domain.
			CO3: Students will be able to Understand the characteristics of linear time invariant systems.
			CO4: Students will be able to Analyze the signals with different transform technique
			CO5: Students will be able to understand how to avoid Aliasing Effect by using Nyquist Criteria and also understand the reation between convolution and correlation
5	II-I	EC305ES- Probability Theory & Stochastic Process	CO1: Students will be able to Understand the concepts of Random Process and its Characteristics.
			CO2: Students will be able to Understand the response of linear time Invariant system for a Random Processes.
			CO3: Students will be able to Determine the Spectral and temporal characteristics of Random Signals.
			CO4: Students will be able to Understand the concepts of Noise in Communication systems.
			CO5: Students will be able to analyze the concepts of auto correlation and cross correlation
6	III-I	EC501PC- Microprocessors	CO1: Students will be able to Understands the internal architecture,





		& Microcontrollers	<p>organization and assembly language programming of 8086 processors.</p> <p>CO2: Students will be able to Understands the internal architecture, organization and assembly language programming of 8051/controllers</p> <p>CO3: Students will be able to Understands the interfacing techniques to 8086 and 8051 based systems.</p> <p>CO4: Students will be able to Understands the internal architecture of ARM processors and basic concepts of advanced ARM processors.</p> <p>CO5: Students will be able to Understands the internal architecture of CORTEX processors and basic concepts of advanced CORTEX processors.</p>
7	III- I	EC502PC-Data Communications & Networks	<p>CO1: Students will be able to Know the Categories and functions of various Data communication Networks</p> <p>CO2: Students will be able to Design and analyze various error detection techniques.</p> <p>CO3: Students will be able to Demonstrate the mechanism of routing the data in network layer</p> <p>CO4: Students will be able to Know the significance of various Flow control and Congestion control Mechanisms</p> <p>CO5: Students will be able to Know the Functioning of various Application layer Protocols.</p>
8	III- I	EC503PC- Control Systems	<p>CO1: Students will be able to Understand the modeling of linear-time-invariant systems using transfer function and statespace representations.</p> <p>CO2: Students will be able to Understand the concept of stability and its assessment for linear-time invariant systems</p> <p>CO3: Students will be able to Design simple feedback controllers.</p> <p>CO4: Design various Controllers and Compensators to improve Sytem Performance</p>





			CO5: Students will be able to Know the concepts of stability using State Space Anlysis
9	III- I	SM504MS- Business Economics & Financial Analysis	CO1: The students will understand the various Forms of Business and the impact of economic variables on the Business.
			CO2: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
			CO3: The Students can study the firm's financial position by analysing the Financial Statements of a Company.
			CO4: Students will be able to rules for maintaining Books of Accounts
			CO5: Students will be able to understand how to make finacial Anlysis through ratio's
10	III-I	EC513PE- Electronic Measurements & Instrumentation	CO1: Measure electrical parameters with different meters and understand the basic definition of measuring parameters.
			CO2: Use various types of signal generators, signal analyzers for generating and analyzing various real-time signals.
			CO3: Operate an Oscilloscope to measure various signals.
			CO4: Measure various physical parameters by appropriately selecting the transducers.
			CO5: Student will understand various bridges
11	IV-I	EC701PC- Microwave Engineering	CO1: To analyze completely the rectangular waveguides, their mode characteristics, and design waveguides for solving practical microwave transmission line problems
			CO2: To distinguish between the different types of waveguide and ferrite components, explain their functioning and select proper components for engineering applications.
			CO3: To distinguish between the methods of power generation at microwave frequencies, derive the





			<p>performance characteristics of 2-Cavity and Reflex Klystrons, Magnetrons, TWTs and estimate their efficiency levels, and solve related numerical problems</p> <p>CO4: To realize the need for solid state microwave sources, understand the concepts of TEDs, RWH Theory and explain the salient features of Gunn Diodes and ATT Devices.</p> <p>CO5: To establish the properties of Scattering Matrix, formulate the S-Matrix for various microwave junctions, and understand the utility of S-parameters in microwave component design.</p>
12	IV-I	EC502PC- Computer Networks	<p>CO1: Students should understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.</p> <p>CO2: Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.</p> <p>CO3: Student will know about Multicast Routing Protocols</p> <p>CO4: Student will study about Bluetooth, Zigbee, IPv4, IPv6.</p> <p>CO5: Student will be know about DNS in Internet</p>
13	IV-I	EC732PE- Electronic Measurements and Instrumentation	<p>CO1: Student will Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement</p> <p>CO2: Measure various physical parameters by appropriately selecting the transducers.</p> <p>CO3: Use various types of signal generators, signal analyzers for generating and analyzing various real-time signals.</p> <p>CO4: Student will Operate an</p>





			Oscilloscope to measure various signals. CO5: Student will know about Flow Measurement, Displacement Meters, Liquid level Measurements
14	IV-I	EC811PE-Satellite Communications	CO1: Students will understand the historical background, basic concepts and frequency allocations for satellite communication
			CO2: Students will demonstrate orbital mechanics, launch vehicles and launchers
			CO3: Students will demonstrate the design of satellite links for specified C/N with system design examples.
			CO4: Students will be able to visualize satellite sub systems like Telemetry, tracking, command and monitoring power systems etc
			CO5: Students will understand the various multiple access systems for satellite communication systems and satellite packet communications.
15	IV-I	EC702PC-VLSI Design	CO1: Students will be able to Acquire qualitative knowledge about the fabrication process of integrated circuit using MOS transistors.
			CO2: Students will be able to Choose an appropriate inverter depending on specifications required for a circuit
			CO3: Students will be able to Draw the layout of any logic circuit which helps to understand and estimate parasitic of any logic circuit
			CO4: Students will be able to Design different types of logic gates using CMOS inverter and analyze their transfer characteristics
			CO5: Students will be able to Provide design concepts required to design building blocks of data path using gates.
			CO6: Students will be able to Design simple memories using MOS transistors and can understand design of large memories.





			<p>CO7: Students will be able to Design simple logic circuit using PLA, PAL, FPGA and CPLD.</p> <p>CO8: Students will be able to Understand different types of faults that can occur in a system and learn the concept of testing and adding extra hardware to improve testability of system</p>
SEMESTER II			
16	II-II	MA401BS- Laplace Transform, Numerical Methods & Complex Variables	<p>CO1: Students will be able to Use the Laplace transforms techniques for solving ODE's</p>
			<p>CO2: Students will be able to Find the root of a given equation.</p>
			<p>CO3: Students will be able to Estimate the value for the given data using interpolation</p>
			<p>CO4: Students will be able to Find the numerical solutions for a given ODE's</p>
			<p>CO5: Students will be able to Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems.</p>
			<p>CO6: Students will be able to Taylor's and Laurent's series expansions of complex Function</p>
17	II-II	EC402PC- Electromagnetic Fields & Waves	<p>CO1: Students will be able to Get the knowledge of Basic Laws, Concepts and proofs related to Electrostatic Fields and Magnetostatic Fields.</p>
			<p>CO2: Students will be able to Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions.</p>
			<p>CO3: Students will be able to Analyze the Wave Equations for good conductors, good dielectrics and</p>





			<p>evaluate the UPW Characteristics for several practical media of interest</p> <p>CO4: Students will be able to analyze completely the rectangular waveguides, their mode characteristics, and design waveguides for solving practical problems.</p> <p>CO5: Students will be able to analyze the wave for good conductors and good dielectrics</p>
18	II-II	EC403PC- Analog & Digital Communications	<p>CO1: Students will be able to analyze and design of various continuous wave and angle modulation and demodulation techniques</p> <p>CO2: Students will be able to understand the effect of noise present in continuous wave and angle modulation techniques.</p> <p>CO3: Students will be able to attain the knowledge about AM, FM Transmitters and Receivers.</p> <p>CO4: Students will be able to analyze and design the various Pulse Modulation Techniques.</p> <p>CO5: Students will be able to understand the concepts of Digital Modulation Techniques and Baseband transmission.</p>
19	II-II	EC405PC- Electronic Circuit Analysis	<p>CO1: Students will be able to design the multistage amplifiers and understand the concepts of High Frequency Analysis of Transistors.</p> <p>CO2: Students will be able to utilize the concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations.</p> <p>CO3: Students will be able to design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications.</p> <p>CO4: Students will be able to design Multivibrators and sweep circuits for various applications.</p>





			CO5: Students will be able to know the features of a Time base Signals .
20	II-II	EC404PC- Linear IC Applications	CO1: Students will be able to A thorough understanding of operational amplifiers with linear integrated circuits.
			CO2: Students will be able to Attain the knowledge of functional diagrams and applications of IC 555 and IC 565
			CO3: Students will be able to Acquire the knowledge about the Data converters.
			CO4: Students will be able to understand different type of active filters and Oscillators circuit
			CO5: Students will be able to understand the A/D and D/A converter Application
21	III- II	EC601PC- Antennas and Propagation	CO1: Students will be able to Characterize the antennas based on frequency, configure the geometry and establish the radiation patterns of VHF, UHF and Microwave antennas and also antenna arrays
			CO2: Students will be able to Specify the requirements for microwave measurements and arrange a setup to carry out the antenna far zone pattern and gain measurements in the laboratory.
			CO3: Students will be able to Classify the different wave propagation mechanisms, determine the characteristic features of different wave propagations, and estimate the parameters involved.
			CO4: Students will be able to Students Can Able design the Micro strip Patch antenna
			CO5: Students will be able to Students Can Able to measure the antenna parameters
22	III- II	EC602PC - Digital Signal Processing	CO1: Students will be able to Understand the LTI system characteristics and Multirate signal processing.
			CO2: Students will be able to Understand the inter-relationship





			<p>between DFT and various transforms.</p> <p>CO3: Students will be able to Design a digital filter for a given specification.</p> <p>CO4: Students will be able to Understand the significance of various filter structures and effects of round off errors.</p> <p>CO5: Students will be able to Understand the MULTI RATE SIGNAL PROCESSING</p>
23	III- II	EC603PC-VLSI Design	<p>CO1: Students will be able to Acquire qualitative knowledge about the fabrication process of integrated circuits using MOS transistors.</p> <p>CO2: Students will be able to Draw the layout of any logic circuit which helps to understand and estimate parasitic effect of any logic circuit</p> <p>CO3: Students will be able to Design building blocks of data path systems, memories and simple logic circuits using PLA, PAL, FPGA and CPLD.</p> <p>CO4: Students will be able to Understand different types of faults that can occur in a system and learn the concept of testing and adding extra hardware to improve testability of system.</p> <p>CO5: Students will be able to know variopus CMOS Testing Techniques</p>
25	III-II	EC613PE - Embedded System Design	<p>CO1: Students will be able to To understand the selection procedure of Processors in the embedded domain.</p> <p>CO2: Students will be able to Design Procedure for Embedded Firmware.</p> <p>CO3: Students will be able to To visualize the role of Real time Operating Systems in Embedded Systems.</p> <p>CO4: Students will be able to To evaluate the Correlation between task synchronization and latency issues</p> <p>CO5: Students will be able to know and understand message passing and remote procedure calling in TASK</p>





			Communication of ES OS
26	III-II	PE512OE- Renewable Energy Sources	CO1: Students will be able to Understand the principles of wind power and solar photovoltaic power generation, fuel cells.
			CO2: Students will be able to Assess the cost of generation for conventional and renewable energy plants
			CO3: Students will be able to Design suitable power controller for wind and solar applications
			CO4: Students will be able to Analyze the issues involved in the integration of renewable energy sources to the grid
			CO5: Students will be able to know Renewable Energy Sources-Islanding and Interconnection
27	IV-II	EC851PE- Optical Communication s	CO1: Students will be able to Understand and analyze the constructional parameters of optical fibres
			CO2: Students will be able to Be able to design an optical system.
			CO3: Students will be able to Estimate the losses due to attenuation, absorption, scattering and bending.
			CO4: Students will be able to Compare various optical detectors and choose suitable one for different applications.
			CO5: Students will be able to understand the optical fibre transmission media
28	IV-II	EC864PE- Global Positioning System	CO1:
			CO1: Students will be able to Identify GPS components and their functions
			CO2: Students will be able to Select GPS survey method
			CO3: Students will be able to Interpret the navigational message and signals received by the GPS satellite
			CO4: Students will be able to Identify error sources in GPS observations, and apply the corrections for accurate positioning
			CO5: Student will be understand various





			applications of GPS
29	IV-II	CN621OE- Environmental Impact Assessment	CO1: Students will be able to Identify the environmental attributes to be considered for the EIA study.
			CO2: Students will be able to Formulate objectives of the EIA studies.
			CO3: Students will be able to Identify the suitable methodology and prepare Rapid EIA.
			CO4: Students will be able to Indentify and incorporate mitigation measures.
			CO5: Students will be able to learn Assessment statement for various industries.
30	IV-II	EC801PC- Project work	CO1: Students will be able to analyze a problem, identify and define the computing requirements appropriate to its solutions.
			CO2: Students will be able to function effectively on teams to accomplish a common goal.
			CO3: Students will be able to use current techniques, skill and tools necessary for computing practices.
			CO4: Students will be able to design and development principles in the construction of software systems of varying complexity.
			CO5: Students will be able to get an eye opener to bridge gap between Academia and real time industry issues on technological front
			CO6: Students will be able to meet industrial requirement and to improve technical interview skills of a student.


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ELECTRICAL & ELECTRONICS ENGINEERING			
PROGRAMME : B.TECH (EEE)		DEGREE: UG	REG: R18(II,III) & R16(IV) A.Y: 2020-21 SEMESTER: I AND II
S.No	Year/ Sem	Course Name	Course Outcomes
1	II-I	Engineering Mechanics (EE301ES)	CO 1: Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
			CO 2: Solve problem of bodies subjected to friction.
			CO 3: Find the location of centroid and calculate moment of inertia of a given section.
			CO 4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
			CO 5: Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration.
2	II-I	Electrical Circuit Analysis (EE302PC)	CO 1: Apply network theorems for the analysis of electrical circuits.
			CO 2: Obtain the transient and steady-state response of electrical circuits.
			CO 3: Analyze circuits in the sinusoidal steady-state (single-phase and three-phase).
			CO 4: Analyze two port circuit behavior.
			CO 5: Analyze circuits by using Laplace Transform
3	II-I	Analog Electronics (EE303PC)	CO 1: Know the characteristics, utilization of various components.
			CO 2: Understand the biasing techniques
			CO 3: Design and analyze various rectifiers, small signal amplifier circuits.
			CO 4: Design sinusoidal and non-sinusoidal oscillators.
			CO 5: A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linear integrated circuits.
4	II-I	Electrical Machines - I (EE304PC)	CO 1: Identify different parts of a DC machine & understand its operation
			CO 2: Carry out different testing methods to predetermine the efficiency of DC machines
			CO 3: Understand different excitation and starting methods of DC machines
			CO 4: Control the voltage and speed of a DC machines





			CO 5: Analyze single phase and three phase transformers circuits.
5	II-I	Electromagnetic Fields (EE305PC)	CO 1: To understand the basic laws of electromagnetism.
			CO 2: To obtain the electric and magnetic fields for simple configurations under static conditions.
			CO 3: To analyze time varying electric and magnetic fields.
			CO 4: To understand Maxwell's equation in different forms and different media.
			CO 5: To understand the propagation of EM waves.
6	II-I	Electrical Machines Lab - I (EE306PC)	CO 1: Start and control the Different DC Machines.
			CO 2: Assess the performance of different machines using different testing methods
			CO 3: Identify different conditions required to be satisfied for self - excitation of DC Generators.
			CO 4: Separate iron losses of DC machines into different components
7	II-I	Analog Electronics Lab (EE307PC)	CO 1: Know the characteristics, utilization of various components.
			CO 2: Understand the biasing techniques
			CO 3: Design and analyze various rectifiers, small signal amplifier circuits.
			CO 4: Design sinusoidal and non-sinusoidal oscillators.
			CO 5: A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linear integrated circuits.
8	II-I	Electrical Circuits Lab (EE308PC)	CO 1: Analyze complex DC and AC linear circuits
			CO 2: Apply concepts of electrical circuits across engineering
			CO 3: Evaluate response in a given network by using theorems
10	II-II	Laplace Transforms, Numerical Methods & Complex variables (MA401BS)	CO 1: Use the Laplace transforms techniques for solving ODE's and Find the numerical solutions for a given ODE's
			CO 2: Find the root of a given equation.
			CO 3: Estimate the value for the given data using interpolation
			CO 4: Taylor's and Laurent's series expansions of complex function
			CO 5: Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems





11	II-II	Electrical Machines-II (EE402PC)	CO 1: Understand the concepts of rotating magnetic fields.
			CO 2: Understand the operation of ac machines.
			CO 3: Analyze performance characteristics of ac machines.
			CO 4: Explain the role of synchronous generators operation when connected to an infinite bus or when operating in parallel
			CO 5: Analyze the performance of single phase induction and ac series motors
12	II-II	Digital Electronics (EE403PC)	CO 1: Understand working of logic families and logic gates.
			CO 2: Design and implement Combinational logic circuits.
			CO 3: Design and implement Sequential logic circuits.
			CO 4: Understand the process of Analog to Digital conversion and Digital to Analog conversion.
			CO 5: Be able to use PLDs to implement the given logical problem.
13	II-II	Control Systems (EE404PC)	CO 1: Understand the modeling of linear-time-invariant systems using transfer function and state- space representations.
			CO 2: Understand the concept of stability and its assessment for linear-time invariant systems.
			CO 3: Understand the concept of stability and its assessment for Frequency-Response systems.
			CO 4: Test system controllability and observability using state space representation and applications of state space representation to various systems
			CO 5: Design simple feedback controllers.
14	II-II	Power System - I (EE405PC)	CO 1: Understand the concepts of power systems.
			CO 2: Understand the operation of conventional generating stations and renewable sources of electrical power.
			CO 3: Evaluate the power tariff methods.
			CO 4: Determine the electrical circuit parameters of transmission lines
			CO 5: Understand the layout of substation and underground cables and corona.
15	II-II	Digital Electronics Lab (EE406PC)	CO 1: Understand working of logic families and logic gates.
			CO 2: Design and implement Combinational and Sequential logic circuits.





			<p>CO 3: Understand the process of Analog to Digital conversion and Digital to Analog conversion.</p> <p>CO 4: Be able to use PLDs to implement the given logical problem.</p>
16	II-II	Electrical Machines Lab - II (EE407PC)	<p>CO 1: Assess the performance of different machines using different testing methods</p> <p>CO 2: To convert the Phase from three phase to two phase and vice versa</p> <p>CO 3: Compensate the changes in terminal voltages of synchronous generator after estimating the change by different methods</p> <p>CO 4: Control the active and reactive power flows in synchronous machines</p> <p>CO 5: Start different machines and control the speed and power factor</p>
17	II-II	Control Systems Lab (EE408PC)	<p>CO 1: How to improve the system performance by selecting a suitable controller and/or a compensator for a specific application</p> <p>CO 2: Apply various time domain and frequency domain techniques to assess the system performance</p> <p>CO 3: Apply various control strategies to different applications (example: Power systems, electrical drives etc)</p> <p>CO 4: Test system controllability and observability using state space representation and applications of state space representation to various systems</p>
18	III- I	Power Electronics (EE501PE)	<p>CO 1: Understand the differences between signal level and power level devices.</p> <p>CO 2: Analyze controlled rectifier circuits.</p> <p>CO 3: Analyze the operation of DC-DC choppers.</p> <p>CO 4: Analyze the operation of voltage source inverters.</p> <p>CO 5: Analyze the operation of voltage source Converter.</p>
19	III- I	Power Systems – II (EE502PE)	<p>CO 1: Analyze transmission line performance.</p> <p>CO 2: Apply load compensation techniques to control reactive power</p> <p>CO 3: Understand the application of per unit quantities.</p> <p>CO 4: Design over voltage protection and insulation coordination</p> <p>CO 5: Determine the fault currents for symmetrical and unbalanced faults</p>
20	III- I	Measurements	<p>CO 1: Understand different types of measuring</p>





		and Instrumentation (EE503PE)	instruments, their construction, operation and characteristics CO 2: Calibrate PMMC instrument using D.C potentiometer CO 3: Identify the instruments suitable for typical measurements CO 4: Apply the knowledge about transducers and instrument transformers to use them effectively. CO 5: Apply the knowledge of smart and digital metering for industrial applications
21	III- I	High Voltage Engineering (EE512PE)	CO 1: Understand the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials. CO 2: Knowledge of generation and measurement of D. C., A.C., & Impulse voltages. CO 3: To be able to apply knowledge for measurement of high voltage and high current AC,DC and Impulse. CO 4: Knowledge of tests on H. V. equipment and on insulating materials, as per the standards. CO 5: Knowledge of how over-voltages arise in a power system, and protection against these over- voltages.
22	III- I	Business Economics and Financial Analysis (SM504MS)	CO 1: Understand the various Forms of Business and the impact of economic variables on the Business. CO 2: To learn Demand, Supply, Production, Cost, Market Structure, Pricing aspects. CO 3: To study the firm's financial position by analysing the Financial Statements of a Company. CO 4: understand the various Forms of Business and the impact of economic variables on the Business. CO 5: Understand the Financial Analysis through Ratios.
23	III-I	Power System Simulation Lab (EE505PC)	CO 1: Perform various transmission line calculations CO 2: Understand Different circuits time constants CO 3: Analyze the experimental data and draw the conclusions.
24	III-I	Power Electronics Lab (EE506PC)	CO 1: Understand the Financial Analysis through Ratios. CO 2: Use power electronic simulation packages & hardware to develop the power converters. CO 3: Analyze and choose the appropriate converters for various applications
25	III-I	Measurements and Instrumentation Lab (EE507PC)	CO 1: To choose instruments CO 2: Test any instrument CO 3: Find the accuracy of any instrument by performing experiment





			CO 4: Calibrate PMMC instrument using D.C potentiometer
26	III-I	Advanced Communication Skills Lab (EN508HS)	CO 1: To improve students' fluency in spoken English spoken at normal conversational speed
			CO 2: To help students develop their vocabulary
			CO 3: To read and comprehend texts in different contexts and communicate their ideas relevantly and coherently in writing
			CO 4: To make students industry-ready
			CO 5: To help students acquire behavioral skills for their personal and professional life
27	III-II	Non Conventional Energy Sources (MT601OE)	CO 1: Knowledge of working principle of various energy systems
			CO 2: Understand the principles of wind power and solar photovoltaic power generation, fuel cells.
			CO 3: Understand the principles of Bio-mass and Geothermal
			CO 4: Assess the cost of generation for conventional and renewable energy plants
			CO 5: Design suitable power controller for wind and solar applications
28	III-II	Power Semiconductor Drives (EE612PE)	CO 1: Identify the drawbacks of speed control of motor by conventional methods.
			CO 2: Differentiate Phase controlled and chopper-controlled DC drives speed-torque characteristics merits and demerits
			CO 3: Understand Ac motor drive speed-torque characteristics using different control strategies its merits and demerits
			CO 4: Describe Slip power recovery schemes
			CO 5: Explain the fundamentals of electric drive and different electric braking methods.
29	III-II	Signals and systems lab (EE607PC)	CO 1: Differentiate various signal functions.
			CO 2: Represent any arbitrary signal in time and frequency domain.
			CO 3: Understand the characteristics of linear time invariant systems.
			CO 4: Graphical and analytical proof for Sampling theorem and its Correlation
			CO 5: Analyze the signals with different transform technique
30	III-II	Microprocessors &	CO 1: Understands the internal architecture, organization and assembly language programming of





		Microcontrollers (EE602PC)	8086 processors. CO 2: Understands the internal architecture, organization and assembly language programming of 8051/controllers CO 3: Understands the interfacing techniques to 8086 and 8051 based systems. CO 4: Understands the internal architecture of ARM processors CO 5: Understands the basic concepts of advanced ARM processors.
31	III-II	Power System Protection (EE603PC)	CO 1: Compare and contrast electromagnetic, static and microprocessor-based relays CO 2: Apply technology to protect power system components. CO 3: Select relay settings of over current and distance relays. CO 4: Analyze quenching mechanisms used in air, oil and vacuum circuit breakers CO 5: Generates understanding of different types of static relays with a view to application in the system.
32	III-II	Power system operation and control (EE604PC)	CO 1: Understand operation and control of power systems. CO 2: Analyze various functions of Energy Management System (EMS) functions. CO 3: Analyze whether the machine is in stable or unstable position. CO 4: Able to find out the load flow solution of a power system network using different types of load flow methods. CO 5: Understand power system deregulation and restructuring
33	III-II	Power system lab (EE605PC)	CO 1: Perform various load flow techniques CO 2: Understand Different protection methods CO 3: Analyze the experimental data and draw the conclusions.
34	III-II	Microprocessors & Microcontrollers lab (EE606PC)	CO 1: Understands the internal architecture and organization of 8086, 8051 and ARM processors/controllers. CO 2: Understands the interfacing techniques to 8086 and 8051 and can develop assembly language programming to design microprocessor/ micro controller based systems.
35	III-II	Signals and systems lab	CO 1: Understand the concepts of continuous time and discrete time systems.





		(EE607PC)	<p>CO 2: Analyse systems in complex frequency domain.</p> <p>CO 3: Understand sampling theorem and its implications.</p>
36	IV-1	Power Semiconductor Drives (EE701PC)	<p>CO 1: Identify the drawbacks of speed control of motor by conventional methods.</p> <p>CO 2: Differentiate Phase controlled and chopper controlled DC drives speed-torque characteristics merits and demerits</p> <p>CO 3: Understand Induction motor drive speed-torque characteristics using different control strategies its merits and demerits</p> <p>CO 4: Describe Slip power recovery schemes</p> <p>CO 5: Understand Synchronous motor drive speed-torque characteristics using different control strategies its merits and demerits</p>
37	IV-I	Power System Operation and Control (EE702PC)	<p>CO 1: Analyze the optimal scheduling of power plants</p> <p>CO 2: Analyze the steady state behavior of the power system for voltage and frequency fluctuations</p> <p>CO 3: Understand unit commitment problem and importance of economic load dispatch</p> <p>CO 4: Describe reactive power control of a power system</p> <p>CO 5: Design suitable controller to dampen the frequency and voltage steady state oscillations</p>
38	IV-1	HVDC Transmission (EE722PE) (Professional Elective – II)	<p>CO 1: Compare EHV AC and HVDC system and to describe various types of DC links</p> <p>CO 2: Analyze Graetz circuit for rectifier and inverter mode of operation</p> <p>CO 3: Describe various methods for the control of HVDC systems and to perform power flow analysis in AC/DC systems</p> <p>CO 4: Describe various protection methods for HVDC systems</p> <p>CO 5: Describe classify Harmonics and design different types of filters</p>
39	IV-1	Power Quality (EE732PE) (Professional Elective – III)	<p>CO 1: Know the severity of power quality problems in distribution system</p> <p>CO 2: Understand the concept of voltage sag transformation from up-stream (higher voltages) to down-stream (lower voltage)</p> <p>CO 3: Concept of improving the power quality to sensitive load by various mitigating custom power devices</p>





40	IV-I	Flexible A.C. Transmission Systems (EE743PE) (Professional Elective – IV)	CO 1: Choose proper controller for the specific application based on system requirements
			CO 2: Understand various systems thoroughly and their requirements
			CO 3: Understand the Objectives of shunt compensation
			CO 4: Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping
			CO 5: Understand the Power and control circuits of Series Controllers GCSC, TSSC and TCSC
41	IV-I	Electrical Systems simulation lab (EE703PC)	CO 1: Design and Analyze electrical systems in time and frequency domain
			CO 2: Analyze various transmission lines and perform fault analysis
			CO 3: Model Load frequency control of Power Systems
			CO 4: Design various Power Electronic Converters and Drives.
42	IV-I	EE704PC: ELECTRICAL WORKSHOP	CO 1: Get practical knowledge related to electrical
			CO 2: Fabricate basic electrical circuit elements/networks
			CO 3: Trouble shoot the electrical circuits
			CO 4: Design filter circuit for application
			CO 5: Get hardware skills such as soldering, winding etc.
			CO6: Get debugging skills.
43	IV-II	Renewable Energy Sources MT8310 E	CO 1: Understanding of renewable energy sources
			CO 2: Knowledge of working principle of various energy systems
			CO 3: Capability to carry out basic design of renewable energy systems
44	IV-II	Electrical Distribution Systems (EE852PE)	CO 1: distinguish between transmission, and distribution line and design the feeders
			CO 2: Understand Objectives of protection coordination
			CO 3: compute power loss and voltage drop of the feeders
			CO 4: design protection of distribution systems
			CO 5: understand the importance of voltage control and power factor improvement
45	IV-II	Utilization of Electric Power (EE863PE)	CO 1: Acquire knowledge on, electric drives characteristics and their applicability in industry based on the nature of different types of loads and their



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			characteristics
			CO 2: understands the concepts and methods of electric heating, welding, illumination and electric traction
			CO 3: Able to determine the speed/time characteristics of different types of traction motors.
			CO 4: Able to estimate energy consumption levels at various modes of operation.
			CO 5: apply the above concepts to real-world electrical and electronics problems and applications.

[Handwritten Signature]
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DEPARTMENT OF INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY			
PROGRAMME: INFORMATION TECHNOLOGY	DEGREE: UG	A.Y: 2020-21	SEMESTER: I
S.No	Year/ Sem	Course Name	Course Outcomes
			(Student can able to understand)
1	II- I	CS301ES-ANALOG AND DIGITAL ELECTRONICS	CO1: Know the characteristics of various components.
			CO2: Understand the utilization of components
			CO3: Design and analyze small signal amplifier circuits
			CO4: Learn Postulates of Boolean algebra and to minimize combinational functions
			CO5: Design and analyze combinational and sequential circuits
2	II- I	CS302PC-DATA STRUCTURES	CO1: Ability to select the data structures that efficiently model the information in a problem.
			CO2: Ability to assess efficiency trade-offs among different data structure implementations or combinations.
			CO3: The course is designed to develop skills to design and analyze simple linear and non linear data structures
			CO4: It strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem.
			CO5: Approaches to Problem Solving.
3	II- I	MA303BS- COMPUTER ORIENTED STATISTICAL METHODS	CO1: Apply the concepts of probability and distributions to some case studies
			CO2: Correlate the material of one unit to the material in other units
			CO3: Resolve the potential misconceptions and hazards in each





			topic of study
			CO4: The sampling theory and testing of hypothesis and making inferences
			CO5: The theory of Probability, and probability distributions of single and multiple random variables
4	II-I	IT304PC- COMPUTER ORGANIZATION AND MICROPROCESSOR	CO1: Able to understand the basic components and the design of CPU, ALU and Control Unit
			CO2: Ability to understand memory hierarchy and its impact on computer cost/performance
			CO3: Ability to understand the advantage of instruction level parallelism and pipelining for high performance Processor design.
			CO4: Ability to understand the instruction set, instruction formats and addressing modes of 8086
			CO5: Ability to write assembly language programs to solve problems.
5	II-I	CS305PC-OBJECT ORIENTED PROGRAMMING USING C++	CO1: Able to develop programs with reusability
			CO2: Develop programs for file handling
			CO3: Handle exceptions in programming
			CO4: Develop applications for a range of problems using object-oriented programming techniques
			CO5: practice the use of C++ classes and class libraries, arrays, vectors, inheritance and file I/O stream concepts.
6	II-I	CS306ES-ANALOG AND DIGITAL ELECTRONICS LAB	CO1: Know the characteristics of various components.
			CO2: Understand the utilization of components
			CO3: Design and analyze small signal amplifier circuits
			CO4: Postulates of Boolean algebra and to minimize combinational





			functions
			CO5: Design and analyze combinational and sequential circuits
7	II-I	CS307PC-DATA STRUCTURES LAB	CO1: Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
			CO2: Ability to Implement searching and sorting algorithms
			CO3: Able to Design & implement various forms of inheritance, String class, calling base class constructors .
			CO4: Able to Apply & Analyze operator overloading, runtime polymorphism , Generic Programming.
			CO5: Able to Analyze and explore various Stream classes, I/O operations and exception handling.
8	II-I	IT308PC-IT WORKSHOP AND MICROPROCESSOR LAB	CO1: Identify various hardware components of a system
			CO2: Assemble the computer.
			CO3: Use various Microsoft tools.
			CO4: Developing ALP for fixed and Floating Point and Arithmetic operations using 8086 microprocessor.
			CO5: Make use of different I/O interfacing with 8086 microprocessor
9	II-I	CS309PC- C++ PROGRAMMING LAB	CO1: Ability to develop applications for a range of problems using object-oriented programming techniques
			CO2: To learn the fundamental programming concepts and methodologies which are essential to building good C++ programs.





			<p>CO3:To practice the fundamental programming methodologies in the C++ programming language via laboratory experiences.</p> <p>CO4:To code, document, test, and implement a well-structured, robust computer program using the C++ programming language.</p> <p>CO5:To write reusable modules (collections of functions).</p>
10	II-I	*MC309-GENDER SENSITIZATION LAB	<p>CO1: Students will have developed a better understanding of important issues related to gender in contemporary India.</p> <p>CO2: Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film</p> <p>CO3: Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.</p> <p>CO4: Students will acquire insight into the gendered division of labour and its relation to politics and economics.</p> <p>CO5:Men and women students and professionals will be better equipped to work and live together as equals.</p>
11	III-I	CS502PC-SOFTWARE ENGINEERING	<p>CO1: Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).</p> <p>CO2: Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative</p>





			choices.
			CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
			CO4: Understanding of implementation issues such as modularity and coding standards.
			CO5: Understanding of different software architectural styles.
12	III-I	IT503PC-DATA COMMUNICATION AND COMPUTER NETWORKS	<p>CO1: Students should be understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.</p> <p>CO2: Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.</p> <p>CO3: To explore various layers of osi model</p> <p>CO4: to demonstate the TCP/IP and osi model with merits and demerits</p> <p>CO5: to introduce udp and tcp models</p>
13	III-I	IT504PC- WEB PROGRAMMING	<p>CO1: Design web pages.</p> <p>CO2: Use technologies of Web Programming</p> <p>CO3: Apply object-oriented aspects to Scripting.</p> <p>CO4: Create databases with connectivity using JDBC.</p> <p>CO5: Build web-based application using sockets.</p>
14	III-I	CS515PE- PRINCIPLES OF PROGRAMMING LANGUAGES(PE-I)	<p>CO1: Acquire the skills for expressing syntax and semantics in formal notation</p> <p>CO2: Identify and apply a suitable programming paradigm for a given computing application</p>





			<p>CO3: Gain knowledge of and able to compare the features of various programming languages</p> <p>CO4: Ability to Building a Runnable Program</p> <p>CO5: understanding Programming Paradigms</p>
15	III-I	<p>CS522PE- ADVANCED OPERATING SYSTEMS (Professional Elective - II)</p>	<p>CO1: Understand the design approaches of advanced operating systems</p> <p>CO2: Analyze the design issues of distributed operating systems</p> <p>CO3: Evaluate design issues of multi processor operating systems.</p> <p>CO4: Identify the requirements Distributed File System and Distributed Shared Memory.</p> <p>CO5: Formulate the solutions to schedule the real time applications.</p>
16	III-I	<p>CS505PC- SOFTWARE ENGINEERING LAB</p>	<p>CO1: Ability to translate end-user requirements into system and software requirements</p> <p>CO2: Ability to generate a high-level design of the system from the software requirements</p> <p>CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report</p> <p>CO4: Understanding of implementation issues such as modularity and coding standards.</p> <p>CO5: Understanding of different software architectural styles.</p>
17	III-I	<p>IT506PC- COMPUTER NETWORKS & WEB TECHNOLOGIES LAB</p>	<p>CO1: Implement data link layer farming methods</p> <p>CO2: Analyze error detection and error correction codes</p> <p>CO3: Implement and analyze routing and congestion issues in network design.</p> <p>CO4: Implement Encoding and Decoding techniques used in presentation layer</p>





			CO5: To be able to work with different network tools
18	III-I	EN508HS- ADVANCED COMMUNICATION SKILLS LAB	CO1: Ability in writing
			CO2: ability in interview skills
			CO3: ability in Resume writing, and facing the interviews on current corporate organizations
			CO4: To make students industry-ready
			CO5: To respond appropriately in different socio-cultural and professional contexts
19	III-I	*MC510- INTELLECTUAL PROPERTY RIGHTS	CO1: Apply intellectual property law principles to real problems and analyse the social impact of intellectual property law and policy
			CO2: Work in teams, solve problems and manage time
			CO3: Analyse ethical and professional issues which arise in the intellectual property law context
			CO4: Write reports on project work and critical reflect on your own learning.
			CO5: To learn the procedure of obtaining Patents, Copyrights, Trade Marks & Industrial Design
20	IV-I	IT304PC-Data Mining	CO1: Ability to perform the preprocessing of data and apply mining techniques on it
			CO2: Ability to identify the association rules, classification and clusters in large data sets
			CO3: Ability to solve real world problems in business and scientific information using datamining
			CO4: Ability to classify web pages, extracting knowledge from the web
			CO5: To gain experience doing independent study and research.
21	IV- I	IT702PC-Android Application Development	CO1: Ability to Install and configure Android application development tools.
			CO2: Ability to Design and develop





			<p>user Interfaces for the Android platform.</p> <p>CO3: Save state information across important operating system events.</p> <p>CO4: Apply Java programming concepts to Android application development.</p> <p>CO5: understand the application lifecycle</p>
22	IV- I	CS721PE-Phython programming	<p>CO1: Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.</p> <p>CO2: Demonstrate proficiency in handling Strings and File Systems</p> <p>CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.</p> <p>CO4: Interpret the concepts of Object-Oriented Programming as used in Python.</p> <p>CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.</p>
23	IV-I	CS734PE-software process and project management(PE-III)	<p>CO1: Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation</p> <p>CO2: Analyze the major and minor milestones, artifacts and metrics from management and technical perspective</p> <p>CO3: Design and develop software product using conventional and modern principles of software project management</p> <p>CO4: how to successfully plan and implement a software project management activity</p>





			CO5: complete a specific project in time with the available budget
24	IV-I	CS742PE-Cloud computing(PE-IV)	CO1: This course provides an insight into cloud computing
			CO2: Topics covered include-distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments, resource management.
			CO3: Analyze the problems and solutions to cloud application problems
			CO4: Apply principles of best practice in cloud application design and management
			CO5: Identify and define technical challenges for cloud applications and assess their importance
25	IV-I	IT703PC-Android Application Development-Lab	CO1: Ability to Install and configure Android application development tools.
			CO2: Ability to Design and develop user Interfaces for the Android platform.
			CO3: Save state information across important operating system events.
			CO4: Apply Java programming concepts to Android application development.
			CO5: understand the application lifecycle
26	IV-I	CS751PC-Phython programming-Lab	CO1: Student should be able to understand the basic concepts scripting and the contributions of scripting language
			CO2: Ability to explore python especially the object-oriented concepts, and the built-in objects of Python.
			CO3: Ability to create practical and contemporary applications such as TCP/IP network





			programming, Web applications, discrete event simulations
			CO4: Interpret the concepts of Object-Oriented Programming as used in Python.
			CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
27	IV-I	IT704PC-Industry Oriented Mini Project	CO1: Able to understand one technology at a time and finally merge to make something really good. CO2: Helps to implement what have been learnt
28	IV-I	IT705PC-Seminar	CO1: It's an in-depth investigation of a real-world topic worthy of students attention and effort. CO2: Ability to builds the problem solving skills CO3: The skills that learn by doing projects makes better prepared for the industry
PROGRAMME: INFORMATIO N TECHNOLOGY	DEGREE: UG	A.Y: 2020-21	SEMESTER: II
S.No	Year/ Sem	Course Name	Course Outcomes (Student can able to understand)
1	II- II	CS401PC-DISCRETE MATHEMATICS	CO1: Ability to understand and construct precise mathematical proofs CO2: Ability to use logic and set theory to formulate precise statements CO3: Ability to analyze and solve counting problems on finite and discrete structures CO4: Ability to describe and manipulate sequences CO5: Ability to apply graph theory





			in solving computing problems
2	II- II	SM402MS-BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	CO1: The students will understand the various Forms of Business and the impact of economic variables on the Business
			CO2: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
			CO3: The Students can study the firm's financial position by analyzing the Financial Statements of a Company
			CO4: Analyze a company's financial statements and come to a reasoned conclusion about the financial situation of the company.
			CO5: Acquire the basics of how to analyze and interpret the financial statements through ratio analysis
3	II- II	CS403PC- OPERATING SYSTEMS	CO1: Will be able to control access to a computer and the files that may be shared
			CO2: Demonstrate the knowledge of the components of computer and their respective roles in computing.
			CO3: Ability to recognize and resolve user problems with standard operating environments.
			CO4: Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.
			CO5: Analyze operating system protection and security factors
4	II- II	CS404PC- DATABASE MANAGEMENT SYSTEMS	CO1: Gain knowledge of fundamentals of DBMS, database design and normal forms
			CO2: Master the basics of SQL for retrieval and management of data
			CO3: Be acquainted with the basics of transaction processing and concurrency control.
			CO4: Familiarity with database





			storage structures and access techniques CO5: emphasis on how to organize, maintain and retrieve - efficiently
5	II- II	CS405PC-JAVA PROGRAMMING	CO1: Able to solve real world problems using OOP techniques CO2: Able to understand the use of abstract classes. CO3: Able to solve problems using java collection framework and I/o classes. CO4: Able to develop multithreaded applications with synchronization. CO5: Able to develop applets for web applications.
6	II- II	CS406PC- OPERATING SYSTEMS LAB (Using UNIX/LINUX)	CO1: Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management. CO2: Able to implement C programs using Unix system calls CO3: To familiarize students with the architecture of Unix OS. CO4: To provide necessary skills for developing and debugging programs in UNIX environment. CO5: Develop and debug, C programs created on UNIX platforms.
7	II- II	CS407PC- DATABASE MANAGEMENT SYSTEMS LAB	CO1: Design database schema for a given application and apply normalization CO2: Acquire skills in using SQL commands for data definition and data manipulation. CO3: Develop solutions for database applications using procedures, cursors and triggers CO4: To design and build a simple database system CO5: demonstrate competence with the fundamental tasks involved





			with modeling, designing, and implementing a DBMS.
8	II- II	CS408PC-JAVA PROGRAMMING LAB	CO1:Able to write programs for solving real world problems using java collection frame work.
			CO2: Able to write programs using abstract classes
			CO3:Able to write multithreaded programs.
			CO4: Able to write GUI programs using swing controls in Java.
			CO5:To introduce java compiler and eclipse platform.
9	II- II	*MC409- CONSTITUTION OF INDIA	CO1:Understand the emergence and evolution of Indian Constitution.
			CO2: Understand and analyse federalism in the Indian context.
			CO3: Understand and analyse the three organs of the state in the contemporary scenario.
			CO4: Understand and Evaluate the Indian Political scenario amidst the emerging challenges.
			CO5:Understand the structure and composition of Indian Constitution
10	III-II	IT601PC- INTRODUCTION TO EMBEDDED SYSTEM	CO1: Expected to understand the selection procedure of processors in the embedded domain.
			CO2:Design procedure of embedded firm ware.
			CO3: Expected to visualize the role of realtime operating systems in embedded systems.
			CO4:Expected to evaluate the correlation between task synchronization and latency issue
			CO5: To have knowledge about the basic working of a microcontroller system and its programming in assembly language.
11	III-II	IT602PC- PRINCIPLES OF COMPILER	CO1:Ability to design, develop, and implement a compiler for any language





		CONSTRUCTION	<p>CO2: Able to use lex and yacc tools for developing a scanner and a parser.</p> <p>CO3: Able to design and implement LL and LR parsers</p> <p>CO4: Able to design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity.</p> <p>CO5: Ability to design algorithms to generate machine code</p>
12	III-II	IT603PC- ALGORITHM DESIGN AND ANALYSIS	<p>CO1: Ability to analyze the performance of algorithms</p> <p>CO2: Ability to choose appropriate data structures and algorithm design methods for a specified application</p> <p>CO3: Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs</p> <p>CO4: To get a good understanding of applications of Data Structures.</p> <p>CO5: To be able to carry out the Analysis of various Algorithms for mainly Time and Space Complexity.</p>
13	III-II	IT604PC- INTERNET OF THINGS	<p>CO1: Interpret the impact and challenges posed by IoT networks leading to new architectural models.</p> <p>CO2: Compare and contrast the deployment of smart objects and the technologies to connect them to network.</p> <p>CO3: . Appraise the role of IoT protocols for efficient network communication.</p> <p>CO4: . Elaborate the need for Data Analytics and Security in IoT.</p> <p>CO5: . Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in</p>





			Industry.
14	III-II	CS615PE- SOFTWARE TESTING METHODOLOGIES (Professional Elective - III)	CO1:: Design and develop the best test strategies in accordance to the development model.
			CO2: To study fundamental concepts in software testing
			CO3: To discuss various software testing issues and solutions in software unit test, integration and system testing
			CO4: To expose the advanced software testing topics, such as object-oriented software testing methods.
			CO5: To gain the techniques and skills on how to use modern software testing tools to support software testing projects.
15	III-II	IT605PC- EMBEDDED SYSTEMS & INTERNET OF THINGS LAB	CO1: Experience with a set of tools for embedded systems programming and debugging
			CO2: Experience with implementing several embedded systems with particular focus on the interaction between multiple devices.
			CO3: Able to understand the application areas of IOT
			CO4: Able to understand building blocks of Internet of Things and characteristics
			CO5: To impart skills essential for the design and implementation of Embedded and IoT systems
16	III-II	IT606PC- COMPILER CONSTRUCTION LAB	CO1: Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML
			CO2: Apply client-server principles to develop scalable and enterprise web applications.





			<p>CO3: Ability to design, develop, and implement a compiler for any language</p> <p>CO4: Able to use lex and yacc tools for developing a scanner and a parser.</p> <p>CO5: Able to design and implement LL and LR parsers</p>
17	III-II	CS615PE- SOFTWARE TESTING METHODOLOGIES LAB (Professional Elective - III)	<p>CO1: Design and develop the best test strategies in accordance to the development model.</p> <p>CO2: To provide knowledge of Software Testing Methods.</p> <p>CO3: To develop skills in software test automation and management using latest tools.</p> <p>CO4: Learn to write system specifications of any application and report various bugs in it</p> <p>CO5: Use automated functional testing tool like Quick Test Professional.</p>
18	III-II	*MC609- ENVIRONMENTAL SCIENCE	<p>CO1: Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development</p> <p>CO2: To study about different types of natural resource.</p> <p>CO3: Knowledge and concept of biodiversity and its conservation.</p> <p>CO4: Basic knowledge and concept of causes, effect and control of different type of environmental pollution.</p> <p>CO5: To study population growth and its impact on environment</p>
19	IV-II	EE832OE- MANAGEMENT INFORMATION SYSTEM	<p>CO1: Analyze how information technology impacts a firm</p> <p>CO2: Describe the role of information technology and information systems in business</p>





			<p>CO3:To enable students understand the various knowledge representation methods and different expert system structures as strategic weapons to counter the threats to business and make business more competitive.</p> <p>CO4:To enable the students to use information to assess the impact of the Internet and Internet technology on electronic commerce and electronic business and understand the specific threats and vulnerabilities of computer systems</p> <p>CO5: To provide the theoretical models used in database management systems to answer business questions</p>
20	IV-II	CS854PE-MODERN SOFTWARE ENGINEERING (PROFESSIONAL ELECTIVE – V)	<p>CO1:understand and adhere to professional ethical standards in the system development and modification process, especially by accepting responsibility for the consequences of design decisions and design implementations</p> <p>CO2: the ability to build and configure major operating system components</p> <p>CO3: The ability to analyze and implement solutions to complex problems involving computers and networks</p> <p>CO4:a solid understanding to the methods of modern software engineering</p> <p>CO5: To provide an advanced understanding and knowledge of the software engineering techniques, techniques to collect software requirements from client</p>
21	IV- II	CS814PE-HUMAN COMPUTER INTERACTION	<p>CO1:Ability to apply HCI and principles to interaction design.</p> <p>CO2: Ability to design certain tools</p>





		(PROFESSIONAL ELECTIVE – VI)	for blind or PH people. CO3: an awareness of the range of general human-computer interaction issues that must be considered when designing information systems CO4: learn about multimodal displays for conveying and presenting information. CO5: simple methods for designing and evaluating the quality of user interfaces and spatial displays.
22	IV- II	IT802PC-MAJOR PROJECT	CO1: Understand programming language concepts, along with object oriented concepts as well as software engineering principles or go through the research work and gather knowledge over the field and develop an ability to apply them to software design of real life problems in an industry/ commercial environment or propose methodology in the field of research. CO2: Plan, analyze, design a software project and demonstrate the ability to communicate effectively in speech and writing. CO3: Introduce with major software engineering topics and position them to lead medium sized software projects in industry or propose any new model over the selected field of research that will be useful for future activities. CO4: Learn about and go through the software development cycle with emphasis on different processes - requirements, design, and implementation phases and also learn details about different artifacts produced during software development



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			<p>CO5: Learn about different software development process models and how to choose an appropriate one for a project. Gain confidence at having conceptualized, designed, and implemented a working, medium sized project with their team.</p>


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DEPARTMENT OF MECHANICAL ENGINEERING

PROGRAMME: B.TECH(MECH)	DEGREE: UG		A.Y: 2020-2021	SEMESTER: I/II
SL.No	Year/	Subject Code	Subject Name	Course Outcomes
1	II/I	ME303ES	Mechanics of Solids	CO1: Analyze and design structural members subjected to tension, compression, torsion and bending using fundamental concepts of stress, strain and elastic behaviour.
				CO2: Compute bending stress and shear stress for various configurations of the beams and construct Shear Force and Bending Moment Diagrams.
				CO3: Interpreting principal stresses strains and applies the concept of theories of failure to various structures.
				CO4: Evaluate the resistance and deformation in members, which are subjected to axial, flexural and torsional loads.
				CO5: Implementing the torsion equation to compute torsional stresses in solid and hollow shafts; Analyze and design of thin cylinders.
2	II/I	ME305ES	Metallurgy and Material Science	CO1: Identify the properties of metals with respect to crystal structure and grain size
				CO2: Interpret the phase diagrams of materials
				CO3: Classify and Distinguish different types of cast irons, steels and non ferrous alloys
				CO4: Describe the concept of heat treatment of steels & strengthening mechanisms
				CO5: Explain the powder metallurgy process, types and manufacturing of composite materials
3	II/I	MA301BS	Mathematics - IV	CO1: analyze the complex functions with reference to their analyticity, integration using Cauchy's integral





				<p>theorem</p> <p>CO2: find the Taylor's and Laurent's series expansion of complex functions the bilinear transformation</p> <p>CO3: express any periodic function in term of sines and cosines</p> <p>CO4: express a non-periodic function as integral representation</p> <p>CO5: analyze one dimensional wave and heat equation</p>
4	II/I	ME304ES	Thermodynamics	<p>CO1: Understand and differentiate between different thermodynamic systems and processes.</p> <p>CO2: Understand and apply the laws of Thermodynamics to different types of systems undergoing various processes and to perform thermodynamic analysis.</p> <p>CO3: Evaluate properties of pure substances</p> <p>CO4: Evaluate properties gas mixtures</p> <p>CO5: Understand and analyze the Thermodynamic cycles and evaluate performance parameters.</p>
5	II/I	ME302ES	Kinematics of Machinery	<p>CO1: To understand the basic components and layout of linkages in the assembly of a system / machine</p> <p>CO2: To understand the principles in analysing the assembly with respect to the displacement, velocity, and acceleration at any point in a link of a mechanism.</p> <p>CO3: To understand the motion resulting from a specified set of linkages, design few linkage mechanisms and cam mechanisms for specified output motions.</p> <p>CO4: To understand the basic concepts of toothed gearing and kinematics of gear trains and the effects of friction in motion transmission and in machine components.</p> <p>CO5: The main purpose is to give an idea about the relative motions</p>





				obtained in all the above type of components used in mechanical Engineering.
6	II/I	ME307ES	Mechanics of Solids lab	CO1: Model and analyze the behavior of structural and machine components subjected to various loading and support conditions based on principles of equilibrium and material constitutional relationships.
				CO2: Understand and apply the concept of stress and strain to analyse and design structural members and machine parts under axial load, shear load, bending moment and torsional moment.
				CO3: Solve practical problems through evaluating the relationship between stress and strain.
				CO4: Analysis of composite beams and shafts.
				CO5: Determine the deflections and deformations of loaded flexural members.
7	II/I	ME306ES	Thermodynamics Lab	CO1: Use thermodynamic terminology correctly.
				CO2: Explain fundamental thermodynamic properties.
				CO3: Derive and discuss the first and second laws of thermodynamics.
				CO4: Solve problems using the properties and relationships of thermodynamic fluids.
				CO5: Analyse basic thermodynamic cycles.
8	II/I	ME308ES	Metallurgy and Material Science Lab	CO1: Ability to relate properties to microstructure.
				CO2: Understand various crystal structures and relationship to properties
				CO3: Ability to select metals and alloys for industrial applications
				CO4: Understanding metals and their use in industries
				CO5: Understanding heat treatment procedures and the change of properties
9	II/I	MC300HS	Gender Sensitization Lab	CO1: To develop students' sensibility with regard to issues of





				<p>gender in contemporary India.</p> <p>CO2: To provide a critical perspective on the socialization of men and women.</p> <p>CO3: To introduce students to information about some key biological aspects of genders.</p> <p>CO4: To expose the students to debates on the politics and economics of work.</p> <p>CO5: To help students reflect critically on gender violence. CO6: To expose students to more egalitarian interactions between men and women.</p>
10	II/I	*MC300H S	Gender Sensitization Lab	<p>CO1: To develop students' sensibility with regard to issues of gender in contemporary India.</p> <p>CO2: To provide a critical perspective on the socialization of men and women.</p> <p>CO3: To introduce students to information about some key biological aspects of genders.</p> <p>CO4: To expose the students to debates on the politics and economics of work.</p> <p>CO5: To help students reflect critically on gender violence. CO6: To expose students to more egalitarian interactions between men and women.</p>
11	III/I	ME403PC	Thermal Engineering-I	<p>CO1: At the end of the course, the student should be able to evaluate the performance of IC engines and compressors under the given operating conditions.</p> <p>CO2: Apply the laws of Thermodynamics to evaluate the performance of Refrigeration and air-conditioning cycles.</p> <p>CO3: Understand the functionality of the major components of the IC Engines and effects of operating conditions on their performance</p> <p>CO4: Apply the laws of Thermodynamics to evaluate the performance of Refrigeration and</p>





				air-conditioning cycles. CO5: Understand the functionality of the major components of the IC Engines and effects of operating conditions on their performance
12	III/I	SM504MS	Fundamental of Management	CO1: Understand the basics of Business Economics at Micro level and Demand analysis in particular CO2: Understand Production patterns and various Costs involved. CO3: Learn different types of Markets, Business organizations and Pricing strategies. To enrich students with basic concepts of Financial Accounting. CO4: Understand Evaluation of Long-term Investment Proposals. To increase Competence of Analyzing Financial Statements CO5: Understand the basics of Business Economics at Micro level and Demand analysis in particular
13	III/I	EE5110	Nonconventional Power Generation	CO1: Analyse solar thermal and photovoltaic systems and related technologies for energy conversion. CO2: Understand wind energy conversion and devices available for it. CO3: Understand Biomass conversion technologies, Geo thermal resources and energy conversion principles and technologies. CO4: Realize Power from oceans(thermal,wave,tidal) and conversion devices. CO5: Understand fundamentals of fuel cells and commercial batteries.
14	III/I	ME503PC	Metrology & Machine Tools	CO1: Identify techniques to minimize the errors in measurement. CO2: Identify methods and devices for measurement of length, angle, gear & thread parameters, surface roughness and geometric features of parts. CO3: Understand working of lathe, shaper, planer, drilling, milling and grinding machines.





				<p>CO4:Comprehend speed and feed mechanisms of machine tools.</p> <p>CO5:Estimate machining times for machining operations on machine tools</p>
15	III- I	ME502PC	Design of Machine Members – I	<p>CO1:Understands the impact of material properties and manufacturing considerations in design.</p> <p>CO2:Study the effect of fatigue loading and various failure theories.</p> <p>CO3:Design of Fasteners, riveted, welded, bolted and axially loaded joints..</p> <p>CO4:Design of Keys, Cotters and Knuckle Joints</p> <p>CO5:Design of shafts, shaft couplings and mechanical springs under varying loading conditions.</p>
16	III- I	ME506PC	Machine Tools & Metrology Lab	<p>CO1:Hands on experience on lathe machine to perform turning, facing, threading operations</p> <p>CO2:Practical exposure on flat surface machining, milling and grinding operations.</p> <p>CO3:Skill development in drilling and threading operations.</p> <p>CO4:Linear and angular measurements exposure</p> <p>CO5:Understand the concept of machine tool alignment and Thread measurement by 2-wire and 3-wire methods</p>
17	III- I	MC500HS	Professional Ethics	<p>CO1:The students will understand the importance of Values and Ethics in their personal lives and professional careers.</p> <p>CO2: The students will learn the rights and responsibilities as an employee,team member and a global citizen.</p> <p>CO3:The students will understand the importance of Values and Ethics in their personal lives and professional careers.</p> <p>CO4: The students will learn the rights and responsibilities as an employee,team member and a global citizen.</p>





18	IV/I	733PE	Robotics	CO1: At the end of the course, the student will be able to understand the basic components of robots.
				CO2: Differentiate types of robots and robot grippers. Model forward and
				CO3: Analyze forces in links and joints of a robot.
				CO4: Programme a robot to perform tasks in industrial applications. Design intelligent robots using
				CO5: Design intelligent robots using sensors.
19	IV/I	ME721PE	Power Plant Engineering	CO1: Knowledge of sources of energy and types of power plants..
				CO2: Different types of steam cycles and it's efficiencies in a steam power plant..
				CO3: Understand basic working principles of gas turbine and diesel engine power plants. Define the performance characteristics and components of such power plants..
				CO4: List the principal components and types of nuclear reactors.
				CO5: Estimate Power Plant Economics And Environmental Considerations
20	IV/I	ME711PE	Additive Manufacturing Technology	CO1: Describe various CAD issues for 3D printing and rapid prototyping and related operations for STL model manipulation.`
				CO2: Formulate and solve typical problems on reverse engineering for surface reconstruction from physical prototype models through digitizing and spline-based surface fitting.
				CO3: Formulate and solve typical problems on reverse engineering for surface reconstruction from digitized mesh models through topological modelling and subdivision surface fitting.
				CO4: Explain and summarize the principles and key characteristics of additive manufacturing technologies and commonly used 3D printing and additive manufacturing systems.





				CO5: Explain and summarize typical rapid tooling processes for quick batch production of plastic and metal parts.
21	IV/I	ME603PC	CAD & CAM	CO1: Apply geometric transformation techniques in CAD and Develop mathematical models to represent curves and surfaces.
				CO2: Formulate, analyze and create Models of engineering components using surface and solid modeling techniques.
				CO3: Formulate, analyse and generate the Part programs for CNC to manufacture industrial components.
				CO4: Utilize computers in various aspects of Manufacturing Design, Proper planning, Manufacturing cost, Layout & Material Handling system.
				CO5: Recognize the necessity for integration of CAD and CAM in various industries.
22	IV/I	ME408PC	Instrumentation and Control Systems Lab	CO1: Know the calibration of Thermocouple, Thermister and resistance temperature detector (RTD) for temperature measurement and control of furnace temperature
				CO2: Know the calibration of rotameter for flow measurement and control
				CO3: Know the calibration of LVDT transducer for displacement measurement
				CO4: Know the calibration of accelerometer for the measurement of vibration of vibration exciter at various loads
				CO5: Know the calibration of Optical, Proximity, Tacho Pickups used for the measurement and control of shaft speed
23	IV/I	ME408PC	Instrumentation and Control Systems Lab	CO1: Know the calibration of Thermocouple, Thermister and resistance temperature detector (RTD) for temperature measurement and control of furnace temperature





				<p>CO2: Know the calibration of rotameter for flow measurement and control</p> <p>CO3: Know the calibration of LVDT transducer for displacement measurement</p> <p>CO4: Know the calibration of accelerometer for the measurement of vibration of vibration exciter at various loads</p> <p>CO5: Know the calibration of Optical, Proximity, Tacho Pickups used for the measurement and control of shaft speed</p>
24	IV/I	ME606PC	CAD & CAM Lab	<p>CO1: To use computer engineering software to solve and present problem solutions in a technical format.</p> <p>CO2: To utilize computer skills to enhance learning and performance in other engineering and science courses.</p> <p>CO3: To demonstrate professionalism in interactions with Colleagues, faculty, and staff.</p>
25	II/II	ME501PC	Dynamics of Machinery	<p>CO1: Determine the effect of gyroscopic couple in a dynamic body such as airplanes, ships and four and two wheeler.</p> <p>CO2: Perform static and dynamic analysis to attain equilibrium in mechanisms and synthesize mechanisms for motion, path and function generation</p> <p>CO3: Analyze friction clutches, brakes dynamometer and flywheels.</p> <p>CO4: Determine balancing for rotating and reciprocating mass system and analyze different types of governors.</p> <p>CO5: Perform analysis of the response of one degree of freedom systems with free and forced vibration and evaluate the critical speed of the shaft and simple vibration problems</p>
26	II/II	ME307PC	Machine Drawing Practice	<p>CO1: Preparation of engineering and working drawings with dimensions and bill of material</p>





				<p>during design and development. Developing assembly drawings using part drawings of machine components.</p> <p>CO2: Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.</p> <p>CO3: Selection of section planes and drawing of sections and auxiliary sectional views.</p> <p>CO4: Working drawings for machine parts.</p> <p>CO5: Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features</p>
27	II/II	ME407PC	Fluid Mechanics and Hydraulic Machines Lab	<p>CO1: Able to explain the effect of fluid properties on a flow system.</p> <p>CO2: Able to identify type of fluid flow patterns, describe continuity equation and demonstrate boundary layer concepts</p> <p>CO3: To analyze a variety of practical fluid flow and measuring devices and utilize fluid mechanics principles in design.</p> <p>CO4: To select and analyze an appropriate turbine with reference to given situation in power plants.</p> <p>CO5: To estimate performance parameters of a given Centrifugal and Reciprocating pump.</p>
28	II/II	ME408ES	Manufacturing Process Lab	<p>CO1: Understanding the properties of moulding sands and pattern making.</p> <p>CO2: Fabricate joints using gas welding and arc welding. Evaluate the quality of welded joints.</p> <p>CO3: Basic idea of press working tools and performs moulding studies on plastics.</p> <p>CO4: To get the hands on experience in various metals forming techniques.</p>
29	II/II	ME509PC	Kinematics & Dynamics Lab	<p>CO1: Understand types of motion</p> <p>CO2: Analyze forces and torques of components in linkages</p>





				<p>CO3: Understand static and dynamic balance</p> <p>CO4: Understand forward and inverse kinematics of open-loop mechanisms</p>
30	III- I	SM504MS	Business Economics & Financial Analysis	<p>CO1: Understand the basics of Business Economics at Micro level and Demand analysis in particular</p> <p>CO2: Understand Production patterns and various Costs involved.</p> <p>CO3: The students will understand the various Forms of Business and the impact of economic variables on the Business.</p> <p>CO4: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.</p> <p>CO5: The Students can study the firm's financial position by analysing the Financial Statements of a Company.</p>
31	II/II	ME405EC	Mnufacturing Process	<p>CO1: Understand the idea for selecting materials for patterns.</p> <p>CO2: Types and allowances of patterns used in casting and analyze the components of moulds.</p> <p>CO3: Design core, core print and gating system in metal casting processes Understand arc, gas, solid state and resistance welding processes.</p> <p>CO4: Develop process-maps for metal forming processes using plasticity principles.</p> <p>CO5: Identify the effect of process variables to manufacture defect free products.</p>
32	II/II	ME407PC	Fluid Mechanics and Hydraulic Machines Lab	<p>CO1: Able to explain the effect of fluid properties on a flow system.</p> <p>CO2: Able to identify type of fluid flow patterns, describe continuity equation and demonstrate boundary layer concepts</p> <p>CO3: To analyze a variety of practical fluid flow and measuring devices and utilize fluid mechanics principles in design.</p> <p>CO4: To select and analyze an appropriate turbine with reference to</p>





				given situation in power plants. CO5: To estimate performance parameters of a given Centrifugal and Reciprocating pump.
33	II/II	*MC609	Environmental Science & Technology	<p>CO1: Articulate the interconnected and interdisciplinary nature of environmental studies;</p> <p>CO2: Demonstrate an integrative approach to environmental issues with a focus on sustainability;</p> <p>CO3: Use critical thinking, problem-solving, and the methodological approaches of the social sciences, natural sciences, and</p> <p>CO4: Communicate complex environmental information to both technical and non-technical audiences;</p> <p>CO5: humanities in environmental problem solving; Understand and evaluate the global scale of environmental problems; and Reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world.</p>
34	III- II	*MC510	Intellectual Property Rights	<p>CO1: Understanding the different types of Intellectual Properties (IPs)</p> <p>CO2: Identify different types of the right of ownership, scope of protection as well as the ways to create and to extract value from IP.</p> <p>CO3: Identify activities and constitute IP infringements and the remedies available to the IP owner</p> <p>CO4: Student able to learn International overview on intellectual property, international – trade mark law, copy right law,</p> <p>CO5: Student get an insight on the international patent law and international development in trade secrets law.</p>
35	III- II	ME505PC	Thermal Engineering -II	CO1: Interpret the working cycle of steam power plant and working of different boilers with its applications and also combustion of fuels.





				<p>CO2:analyze problems on steam power plant cycle, boiler draught, chimney height and can also on stem nozzles along with it application in steam power plant.</p> <p>CO3:Understand the working of various steam turbines and analyze the impulse and reaction turbines with their velocity diagrams</p> <p>CO4:Understand the concepts of steam condensers and requirement of steam condensing plant and understand the working principle of gas turbine plant and analyze the cycle to improve the efficiency with intercooling, reheating and regeneration.</p> <p>CO5:Classify the jet propulsive engines and working principle of turbojets and rockets with its nozzle design criteria and analysis.</p>
36	III- II	ME601PC	Design of Machine Members-II	<p>CO1:Determine the basic lubrication mode in bearings, load in ball and roller bearings and its selection procedure based on manufacturer's catalogue data..</p> <p>CO2:Demonstrate the ability to apply the fundamentals of force and stress analysis in the design of various components to successfully satisfy the function of IC engine</p> <p>CO3:Design a power transmission system through belt, rope, and chain drive to meet desired needs in engineering applications..</p> <p>CO4: Analyze and evaluate the forces and stresses in various gear systems.</p> <p>CO5: Design the power screw for transmission applications</p>
37	III- II	ME605PC	Heat Transfer Lab	<p>CO1: Perform steady state conduction experiments to estimate thermal conductivity of different materials</p> <p>CO2: Perform transient heat conduction experiment</p> <p>CO3: Estimate heat transfer coefficients in forced convection, free convection, condensation and</p>





				<p>correlate with theoretical values</p> <p>CO4: Obtain variation of temperature along the length of the pin fin under forced and free convection</p> <p>CO5: Perform radiation experiments: Determine surface emissivity of a test plate and Stefan-Boltzmann's constant and compare with theoretical value</p>
38	III- II	EN608HS	Advanced Communication Skills lab	<p>CO1: Listen and speak effectively</p> <p>CO2: Develop proficiency in academic reading and writing</p> <p>CO3: Increase possibilities of job prospects</p> <p>CO4: Communicate confidently in formal and informal contexts</p>
39	III-II	ME605PC	CAD AND MAT LAB	<p>CO1: Students should be able to apply computer methods for solving a wide range of engineering problems</p> <p>CO2: Students should be able to use computer engineering software to solve and present problem solutions in a technical format</p> <p>CO3: Students should be able to utilize computer skills to enhance learning</p> <p>CO4: performance in other engineering and science courses.</p> <p>CO5: And finally, students should be able to demonstrate professionalism in interactions with Colleges, faculty and staff</p>
40	III- II	ME604PC	Finite Element Methods	<p>CO1: Understand the concepts behind formulation methods in FEM.</p> <p>CO2: Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements.</p> <p>CO3: Develop element characteristic equation and generation of global equation.</p> <p>CO4: Able to apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid</p>





				flow, axi symmetric and dynamic problems and CO5: solve them displacements, stress and strains induced.
41	III- II	ME602PC	Heat Transfer	CO1: Understand the basic modes of heat transfer CO2: Compute one dimensional steady state heat transfer with and without heat generation CO3: Understand and analyze heat transfer through extended surfaces CO4: Understand one dimensional transient conduction heat transfer CO5: Understand concepts of continuity, momentum and energy equations
42	IV/II	17MBA01	ORGANIZATIONAL BEHAVIOUR	CO1: Evolution of Management and contribution of Management thinkers. CO2: The relevance of environmental scanning, planning and to take decisions. CO3: Organizing and controlling CO4: Individual and group Behaviour CO5: Leadership and Motivation.
43	IV/II	ME611PE	UNCONVENTIONAL MACHINING PROCESSES Professional Elective - I	CO1: Identify the selection of processes. CO2: Estimate the material removal rate and cutting force, Analyze surface properties after machining without destructing the material. CO3: in an industrially useful manner, for Unconventional Machining processes. CO4: Understand the basic techniques of Unconventional Machining processes modeling CO5: Design the components of Abrasive Jet machining process, Develop the economic aspects of the different unconventional machining process.
44	IV/II	ME723PE	Renewable Energy Sources	CO1: Understanding of renewable energy sources CO2: Knowledge of working principle of various energy systems CO3: Capability to carry out basic





				<p>design of renewable energy systems</p> <p>CO4: utilization of renewable energy sources for both domestic and industrial applications</p> <p>CO5: analyse the environmental and cost economics of renewable energy sources in comparison with fossil fuels</p>
45	IV/I	ME705PC	Industry Oriented Mini Project	<p>CO1: Demonstrate abilities to model a manufacturing a component & subcomponents.</p> <p>CO2: Design mechanical engineering components and conduct lab-oriented experiments, analyse obtained data and interpret the results for any corrections to obtain practical designs</p> <p>CO3: Visualize and work on multidisciplinary tasks</p>
46	IV/I	ME706PC	Seminar	<p>CO1: Students will be able to express and master public speaking during technical presentations.</p> <p>CO2: Students will be able to get an opportunity; where in individuals can meet others with the same Interests/problems/concerns and also to envisage emerging technologies.</p> <p>CO3: Students will be able to have a sense of renewed hope and inspiration, as sometimes business concerns are lessened by sharing experiences with others.</p> <p>CO4: Students will be able to have a great morale booster for students for career making advancement</p> <p>CO5: Students will be able to become speaker and it will motivate students in facing technical and HR interview rounds.</p>
47	IV/II	ME801PC	Project work	<p>CO1: Students will be able to analyze a problem, identify and define the computing requirements appropriate to its solutions.</p> <p>CO2: Students will be able to function effectively on teams to accomplish a common goal.</p> <p>CO3: Students will be able to use current techniques, skill and tools</p>



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				necessary for computing practices.
				CO4: Students will be able to design and development principles in the construction of software systems of varying complexity.
				CO5: Students will be able to get an eye opener to bridge gap between Academia and real time industry issues on technological front
				CO6: Students will be able to meet industrial requirement and to improve technical interview skills of a student.

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M.TECH –ADVANCED MANUFACTURING SYSTEMS		
	A.Y: 2020-2021	SEMESTER: I/II
Subject Code	Subject Name	Course Outcomes
Professional I Core-I	Automation in Manufacturing	CO1 : Illustrate the basic concepts of automation in machine tools
		CO 2 :Analyze various automated flow lines
		CO 3 :Explain assembly systems and line balancing methods
		CO 4 :Describe the importance of automated material handling and storage systems
		CO 5 :Interpret the importance of adaptive control systems, automated inspection systems.
Professional I Core-II	Theory of Metal Cutting	CO1 :Speed, feed, depth of cut and their influence on surface roughness
		CO 2 :performance measures,
		CO 3 :Metal removal rate
		CO 4 :tool wear rate, machining time
		CO 5 :energy, work done, heat distribution
Professional I Elective -I	Advanced Manufacturing Processes	CO1 : able to understand the working principle of Electron beam
		CO 2 :laser beam and laser beam processes
		CO 3 : Able to understand different types of composite material characteristics
		CO 4 : types of micro & macro machining processes.
		CO 5 :Understand the e-manufacturing & nano materials.
Professional I Elective -II	Additive Manufacturing Technologies	CO1 : it is different and discuss about various types of liquid based,
		CO 2 :solid based and powder-based AM technologies
		CO 3 :Understand the various types of Pre-processing, processing, post-processing errors in AM
		CO 4 :Also to know the various types of data formats and software's used in AM
		CO 5 :Know the various applications of AM in design analysis, aerospace, automotive, biomedical and other fields
	Research Methodology & IPR	CO1 : Understand research problem formulation
		CO 2 :Analyze research related information
		CO 3 :Follow research ethics
		CO 4 :Understand that today's world is controlled by Computer, Information Technology
		CO 5 :Understanding that when IPR would take such important place in growth of individuals & nation
Professional I Core - III	Computer Aided Manufacturing	CO1: Apply geometric transformation techniques in CAM and Develop mathematical models to represent curves and surfaces.
		CO2: Formulate, analyze and create Models of engineering





		components using surface and solid modeling techniques.
		CO3: Formulate, analyse and generate the Part programs for CNC to manufacture industrial components.
		CO4: Utilize computers in various aspects of Manufacturing Design, Proper planning, Manufacturing cost, Layout & Material Handling system.
		CO5: Recognize the necessity for integration of CAM in various industries.
Professional Core - IV	Manufacturing Systems: Simulation Modelling & Analysis	CO1 : Define the state of system W.R.T specified performance measures
		CO 2 :Identify Dynamic Discrete- event stochastic system
		CO 3 :Develop simulation model for the said system
		CO 4 :Analyze the model and present the results to specified confidence level
		CO 5 :analyze the output data of simulation for specified for performance
Professional Elective - III	Materials Technology	CO1 :To understand on elastic, plastic and fractured behaviour of engineering materials.
		CO 2 :To do appropriate selection of metallic
		CO 3 :on-metallic materials for the various engineering applications
		CO 4 :To understand deformation of non crystalline material
		CO 5 :Griffth's Theory, stress intensity factor and fracture Toughness, Toughening Mechanisms
Professional Elective -IV	Total Quality Management	CO1 :To know business excellence models and be able assess organization's performance making reference to their criteria
		CO 2 :To know the principles of total quality management and peculiarities of their implementation
		CO 3 :To be able to use quality management methods analyzing and solving problems of organization
		CO 4 prerequisites of evolution of total quality management and significance of quality gurus' works to the management of modern organizations
		CO 5 :To Communicate why Total Quality Management (TQM) is fundamental to partnering for mutual benefit.
Professional Elective - V	Flexible Manufacturing Systems	CO1 :Develop FMS using the most appropriate technique.
		CO 2 :Implement FMS concept in a manufacturing environment
		CO 3 :Use various types of sensors and actuators in PLC implementations
		CO 4 :Explain the role of automation in manufacturing
		CO 5 :Tell the difference between Group Technology and Cellular Manufacturing
Open Elective	Composite Materials	CO1 : Understanding of types, manufacturing processes, and applications of composite materials
		CO 2 :Basic understanding of linear elasticity with emphasis on the difference between isotropic and anisotropic material behavior.
		CO 3 :Ability to analyze problems on macro and micro mechanical



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		behavior of lamina
		CO 4 :Ability to analyze problems on macro mechanical behavior of laminate
		CO 5 :An ability to compute the properties of a composite laminate with any stacking sequence





COMPUTER SCIENCE & ENGINEERING

Program : M.TECH		Academic Year : 2020-21		Semester : I
S.No	Year /Sem	Course Code	Course Name	Course Outcomes (After completion of the course student can able to :)
1	I/I		MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (PC – I)	CO1: To understand the basic notions of discrete and continuous probability
				CO2: Understand Random samples, sampling distributions of estimators, Methods of Moments and Maximum Likelihood
				CO3: To understand the methods of statistical inference, and the role that sampling distributions play in those methods.
				CO4: Understand graph theory concepts
				CO5: Apply knowledge to computer science fields.
2	I/I		ADVANCED DATA STRUCTURES (PC- II)	CO1: Understand the implementation of symbol table using hashing techniques.
				CO2: Understand the implementation of skiplist types..
				CO3: Understand various types of advanced trees.
				CO4: Develop algorithms for text processing applications.
				CO5: Identify suitable data structures and develop algorithms for computational geometry problems
3	I/I		MACHINE LEARNING (Professional Elective - I)	CO1: Understand Supervised learning Techniques
				CO2: Understand un-Supervised learning Techniques
				CO3: Evaluating Machine Learning algorithms and Model Selection
				CO4: Understand Deep Learning and Feature Representation Learning
				CO5: Understand Scalable Machine Learning (Online and Distributed Learning
4	I/I		CLOUD COMPUTING (Professional Elective - II)	CO1: Define cloud and types of clouds.
				CO2: Explain about cloud architecture and deployment models.
				CO3: Describe Security Issues in Cloud Computing
				CO4: Understand Security Management Standards, Security Management in the Cloud.
				CO5: Understand Audit and Compliance.
5	I/I		ADVANCED DATA STRUCTURES LAB (Lab - I)	CO1: Implement and know the application of algorithms for sorting .
				CO2: Implement and know the application of algorithms for binary tree and Btree





				<p>CO3: Implement and know the application of algorithms for Heap.</p> <p>CO4: Implement and know the application of algorithms for dictionary.</p> <p>CO5: Implement and know the application of algorithms for pattern matching.</p>
6	I/I		MACHINE LEARNING LAB (Lab – II)	<p>CO1: Understand complexity of Machine Learning algorithms and their limitations</p> <p>CO2: Understand modern notions in data analysis-oriented computing</p> <p>CO3: Be capable of confidently applying common Machine Learning algorithms in practice and implementing their own</p> <p>CO4: Be capable of performing experiments in Machine Learning using real-world data.</p> <p>CO5: Implement Back propagation algorithm</p>

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COMPUTER SCIENCE & ENGINEERING				
Program : M.TECH			Academic Year : 2020-21	Semester : I
S.No	Year /Sem	Course Code	Course Name	Course Outcomes (After completion of the course student can able to :)
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				CO3: Implement and know the application of algorithms for Heap. CO4: Implement and know the application of algorithms for dictionary. CO5: Implement and know the application of algorithms for pattern matching.
6	I/I		MACHINE LEARNING LAB (Lab – II)	CO1: Understand complexity of Machine Learning algorithms and their limitations CO2: Understand modern notions in data analysis-oriented computing CO3: Be capable of confidently applying common Machine Learning algorithms in practice and implementing their own CO4: Be capable of performing experiments in Machine Learning using real-world data.

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Date:31/12/2021

DEPARTMENT OF MANAGEMENT STUDIES			
PROGRAMME: MBA		DEGREE: PG	A.Y 2020-2021 REGULATION :R 19 SEM: I AND II
S no	Year/Sem	Course Name	course outcomes
1	I-I	MANAGEMENT AND ORGANIZATIONAL BEHAVIOUR	CO1: Students will be able to understand Evolution of Management and contribution of Management thinkers
			CO2: Students will be able to know the relevance of environmental scanning, planning and to take decisions
			CO3: Students will be able to learn Leadership and Motivation.
			CO4: students will be able to learn Individual and group behaviour while working in organization
			CO 5: to explain organizational culture and describe its dimensions and to examine various organizational designs
2	I-I	BUSINESS ECONOMICS	CO1: Students will learn Economic Principles in Business
			CO2: students will able to gain the knowledge on Forecast Demand and Supply
			CO3: Students will learn market Structure and PricingPractices
			CO4: students are able to learn Production and Cost Estimates in manufacturing industries
			CO5: LEARNING uniform pricing and how it relates to price discrimination and total revenue.
3	I-I	FINANCIAL ACCOUNTING AND ANALYSIS	CO1 : Students will be able to understand Principles of Accounting, Accounting Process
			CO2 : Students will be able to gain insight in to Inventory Valuation
			CO3 : Students will be able to prepare Preparation, Analysis and Interpretation of Financial Statements
			CO4: Use the accounting cycle to develop financial statements from business transactions.
			CO5: Demonstrate an understanding of the principles of internal control and apply them to relatively straight-forward situations to identify strengths and weaknesses.
4	I-I	RESEARCH METHODOLOGY AND STATISTICAL ANALYSIS	CO 1 : Students will be able to understand Conceptual overview of Research
			CO 2 : Students will be able to understand To apply, analyze various simple & advanced statistical tools
			CO 3 : Students will be able to understand to apply the principles of researchmethodology for various projects.
			CO4: Use technology for developing conceptual





			understanding and analyzing data
			CO5: Understand and apply Analysis of Variance in a business context.
5	I-I	LEGAL AND BUSINESS ENVIRONMENT	CO 1 : Students will be able to understand Business Laws related to incorporating a company
			CO 2 : Students can know Law of contract and Negotiable Instruments
			CO 3 : Students will be able to understand Regulatory framework in India.
			CO4:• To enable students to develop their own, considered judgments about issues in business ethics
			CO5: Identify and briefly discuss the three levels of CSR available to the organization.
6	I-I	PROJECT MANAGEMENT	CO 1 : Students will be able to understand Importance of Project Management
			CO 2 : Students will be able to learn how to plan a Project , Execution and implementation
			CO 3 : Students will be able to understand Significance of teams in projects
			CO 4 : Students will be able to estimate the cost by Project evaluation technique
			CO5: STUDENTS WILL LEARN HOW TO TAKE DECISION BY USING SIMULATIONS
7	I-I	BUSINESS COMMUNICATIONS (LAB)	CO 1 : Students will be able to understand the importance of Communication in Business
			CO 2 : Students will be able to understand to develop writing skills and presentation
			CO 3 : Students will be able to understand writing business proposals and letters
			CO 4 : Students will be able to understand application of business communication in the self-development process.
8	I-I	STATISTICAL DATA ANALYSIS LAB	CO 1 : Students will be able to understand Analyse and apply the statistical tools for decision making
			CO 2 : Students will be able to know how to do Hypotheses Testing
			CO 3 : Students will be able to understand Discussion of Results for better decision making.
9	I-II	HUMAN RESOURCE MANAGEMENT	CO 1 : Students will be able to understand HR concepts
			CO 2 : Students will be able to understand Process of recruitment and selection
			CO 3 : Students will be able to understand Learning and development
			CO 4 : Students will be able to understand Performance Management and Compensation
			CO5: Be able to evaluate HRM related social, cultural, ethical and environmental responsibilities and issues in a global context





10	I-II	MARKETING MANAGEMENT	CO 1 : Students will be able to understand concepts of marketing management
			CO 2 : Students will be able to understand to analyze markets and design customer driven strategies
			CO 3 : Students will be able to understand to communicate the decisions towards business development with superior customer value.
			CO4:Conduct market research to provide information needed to make marketing* decisions.
			CO5:To enhance your knowledge about marketing theories, principles, strategies and concepts and how they are applied;
	I-II	FINANCIAL MANAGEMENT	CO 1 : Students will be able to understand Goals of financial function
			CO 2 : Students will know the purpose of Investment criteria and decision process
			CO 3 : Students will be able to understand Capital structure
			CO 4 : Students will be able to understand Asset Liability management
			CO5:Identify funding sources, instruments, and markets
12	I-II	QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS	CO 1 : Students will be able to understand The course covers origin and application of OR
			CO 2 : Students will be able to understand Linear Programming Method
			CO 3 : Students will be able to understand Decision Theory and queuing theory.
			CO4: Facilitate to identifying, accessing, evaluating, and interpreting information and data in support of assignments, projects, or research
			CO5: Develop and understand mathematical models for problems that arise in various disciplines.
13	I-II	ENTREPRENUERSHIP	CO 1 : Students will be able to understand mindset of the entrepreneurs
			CO 2 : Students will be able to understand develop an idea on the legal framework
			CO 3 : Students will be able to understand strategic perspectives in entrepreneurship.
			CO4: understanding of and appreciation for the importance of the impact of globalization and diversity in modern organizations.
			CO5: TO Contribute entrepreneurial and managerial potentials.
14	I-II	LOGISTICS AND SUPPLY CHAIN MANAGEMENT	CO 1 : Students will be able to understand growing importance of Logistics and Supply Chain Management
			CO 2 : Students will be able to understand LSCM Costs and Performance
			CO 3 : Students will be able to understand





			Benchmarking in SCM Sourcing and transportation CO4: understanding of and appreciation for the importance of the impact of globalization and diversity in modern organizations. CO5: TO Contribute entrepreneurial and managerial potentials.
15	I-II	RURAL MARKETING (OPEN ELECTIVE – II)	CO 1 : Students will be able to understand Rural Marketing opportunities CO 2 : Students will be able to understand Rural Economy and Environment CO 3 : Students will be able to understand Social and cultural aspects in rural India CO 4 : Students will be able to understand innovations in rural marketing. CO5:To enhance your knowledge about marketing theories, principles, strategies and concepts and how they are applied;
16	I-II	SUMMER INTERNSHIP	CO 1 : Students will be able to understand Management functions and Organizational structure CO 2 : Students will be able to understand organizational dynamics in terms of organizational behaviour, culture, climate CO 3 : Students will be able to understand Functional domain knowledge CO 4 : Students will be able to understand Processes and systems and External and Internal environment impact on the organization.
17	II-I	PRODUCTION AND OPERATIONS MANAGEMENT	CO1: Students will be able to understand Concepts of Operations management CO2: Students will be able to know the relevance of Product & process design, analysis, CO3: Students will be able to learn Plant location and layout, CO4: students will be able to learn Scheduling and Material CO5: To understand how Enterprise Resource Planning and MRPII systems are used in managing operations
18	II-I	MANAGEMENT INFORMATION SYSTEM	CO1: Students will learn Concepts & applications of Management Information Systems CO2: students will able to gain the Information Systems Planning & Implementations CO3: Students will learn market CyberCrime and information security. CO4: identify appropriate strategies to manage the system implementation process.





			CO5: evaluate the role of information systems in supporting various levels of business strategy.
19	II-I	DATA ANALYTICS	CO1: Students will learn Concepts AND Importance of Analytics
			CO2 : Students will be able to gain insight in to analytical tools
			CO3 :Students will be able to prepare Analytical tools to solve business problems.
			CO4: Foster an ability to critically analyse, synthesise and solve complex unstructured business problems
			CO5: 3. Use advanced techniques to conduct thorough and insightful analysis, and interpret the results correctly with detailed and useful information.
20	20	STRATEGIC ANALYSIS AND PORTFOLIO MANGEMENT	CO 1 : Students will be able to understand Indian Investment Environment
			CO 2 : Students will be able to understand To Bond valuation and management
			CO 3 : Students will be able to understand to Equity valuation of Cash market and derivatives Performance evaluation of Portfolios.
			CO4: Measuring the portfolio performances.
			CO5: Learn to invest in less risk and more return securities.
21	II-I	FINANCIAL INSTITUTIONS MARKETS AND SECURITIES	CO 1 : Students will be able to understand Indian Financial system
			CO 2 : Students can know Banking and Non-Banking Institutions
			CO 3 : Students will be able to DO Financial and Securities markets Fund and Fee based services.
			CO4:Evaluate and create strategies to promote financial products and services.
			CO5: To equip students with the knowledge and skills necessary to become employable in the financial service industry.
22	II-I	STRATEGIC MANAGEMENT ACCOUNTING	CO 1 : Students will be able to understand Fundamentals of Management accounting and Cost accounting
			CO 2 : Students will be able Cost analysis
			CO 3 : Students will be able to understand Marginal costing
			CO 4 : Students will be able to estimate the cost by Budget and Budgetary controls
			CO5: Apply it to a range of planning, control and decision-making situations and adopt it to accommodate changes
23	II-I	PERFORMANCE MANAGEMENT	CO 1 : Students will be able to understand Significance of Performance Management





		SYSTEMS	CO 2 : Students will be able to understand to Communication of Performance Management
			CO 3 : Students will be able to understand Performance Management and Development of Employees Reward System
			CO 4 : Students will be able to understand other performance related concepts.
			CO5: Creating a basis for several administrative decisions strategic planning, succession planning, promotions and performance based payment.
24	II-I	LEARNING AND DEVELOPMENT	CO 1 : Students will be able to understand the importance of Learning performance
			CO 2 : Students will be able to know how to DO Training and Developmen
			CO 3 : Students will be able to understand Training Need Analysis Training Methods
			CO4: Able to learn how to work in teams
			co5: students will learn to develop how to be self motivated
25	II-I	MANAGEMENT OF INDUSTRIAL RELATIONS	CO 1 : Students will be able to understand importance of Industrial Relations
			CO 2 : Students will be able to understand Collective Bargaining Mechanism
			CO 3 : Students will be able to understand Parties and role in Industrial Relations
			CO 4 : Students will be able to understand Labour Legislation aspects
			CO 5: able to learn various collective bargaining procedures and mechanism
26	II-II	STRATEGIC MANAGEMENT	CO 1 : Students will be able to understand Strategic management concepts
			CO 2 : Students will be able to understand Tools and Techniques for Strategic analysis
			CO 3 : Students will be able to understand Strategies for competing in globalised markets
			CO 4 : Students will be able to understand Strategy Evaluation and Control.
			CO5: Appreciation of theoretical and empirical foundation of SM background
27	II-II	INTERNATIONAL FINANCIAL MANAGEMENT	CO 1 : Students will be able to understand International Financial Management
			CO 2 : Students will be able to understand Balance of Payments
			CO 3 : Students will be able to understand Foreign Exchange Markets
			CO 4 : Students will be able to understand Asset and liability Management.
			CO 5: Develop strategies to deal with other types of





			country risks associated with foreign operations
28	II-II	STRATEGIC INVESTMENT AND FINANCIAL DECISIONS	CO 1 : Students will be able to understand Investment Decisions in Risk and uncertainty
			CO 2 : Students can know Strategic investment decisions
			CO 3 : Students will be able to Investment Appraisal Techniques, Financing Decisions
			CO4: Familiarize different types of investment, disinvestments, project abandonment decisions and evidence of internal rate of return
			CO5: Demonstrate the discounted pay back, post pay back, surplus life, surplus payback and bail out pay back
29	II-II	RISK MANAGEMENT	CO 1 : Students will be able to understand Concepts of Risk Management
			CO 2 : Students will be able To calculate Risk Management Measurement
			CO 3 : Students will be able to understand Risk Management using Forward and Futures
			CO 4 : Students will be able to estimate the Risk Management using Options and Swaps.
			CO5: To know about Hedging and the development position of Derivatives in India.
30	II-II	INTERNATIONAL HUMAN RESOURCE MANAGEMENT	CO 1 : Students will be able to understand Cultural aspects of IHRM
			CO 2 : Students will be able to understand to Role of IHRM in Successful MNC
			CO 3 : Students will be able to understand Global human Resource Planning
			CO 4 : Students will be able to understand other Training and development of Global employees
			CO5: Students learn about Women expatriates and their problems
31	II-II	LEADERSHIP AND CHANGE MANAGEMENT	CO 1 : Students will be able to understand Leadership, Role and function of a Leader Leadership theories and styles
			CO 2 : Students will be able to understand to Organizational change concepts
			CO 3 : Students will be able to understand Perspectives of change
			CO 4 : Students will be able to understand Strategies for Managing change
			CO5: Develop a strong group leadership qualities
32	II-II	TALENT AND KNOWLEDGE MANAGEMENT	CO 1 : Students will be able to understand Talent Management Process
			CO 2 : Students will be able to understand to Succession and career planning approaches



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			CO 3 : Students will be able to understand Knowledge management aspects
			CO 4 : Students will be able to understand Knowledge management assessment and solutions
			CO 5: able to attain the globalized knowledge about various processes

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PROGRAM OUTCOMES

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.



11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.


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