GPCET

Pioneering Innovative Education

REGULATION R20
COURSE OUTCOMES

CIVIL I-I

Course name: **MATHEMATICS -I** **A30002** Course year:2020-21

A30002.1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
A30002.2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
A30002.3	Utilize mean value theorems to real life problems.
A30002.4	Familiarize with functions of several variables which is useful in optimization.
A30002.5	Apply important tools of calculus in higher dimensions and will become familiar with 2-dimensional coordinate systems.
A30002.6	Analyze 3- dimensional coordinate systems and utilization of special functions.

Course name: **ENGNEERING PHYSICS A30004** Course year:2020-21

A30004.1	Understand the basic concepts of electrical elements.
A30004.2	Understand and analyses the basic laws.
A30004.3	Understand and apply the connections of series and parallel circuits
A30004.4	Understand and apply the KCL and KVL.
A30004.5	Understand and apply the basic wiring systems.
A30004.6	Demonstration of parts of DC and AC Machines.

Course name: **COMPUTER PROGRAMMING A30501** Course year:2020-21

A30501.1	Comprehend the fundamental concepts of computer hardware and problem solving Abilities
A30501.2	Knowledge on the basic concepts of algorithms, flow charts and python programming.
A30501.3	Ability to analyze the procedure for providing input and acquire output from theprogram along with implementation of control statements.
A30501.4	Interpret the importance of functions in programming
A30501.5	Analyze and modularize the problem and its solution by using functions.
A30501.6	Ability to relate the concepts of strings, files and pre-processors to the real-world Applications.

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Course name: **COMMUNICATIVE ENGLISH A30001** Course year:2020-21

A30001.1	Remember the concepts which the student has learnt previously and identify it heirconnection
A30001.2	Understand the context, topic, and pieces of specific information from social or Transactional dialogues spoken by native speakers of English
A30001.3	Apply grammatical structures to formulate sentences and correct word forms
A30001.4	Analyze discourse markers to speak clearly on a specific topic in informal discussions
A30001.5	Evaluate reading/listening texts and to write summaries based on globalprehension of these texts
A30001.6	Create a coherent paragraph interpreting a figure/graph/chart/table

Course name: **ENGINEERING GRAPHICS AND COMPUTER AIDED RAFTING A30301** Course year:2020-21

A30301.1	Construct various curves like ellipse, parabola, hyperbola etc which are used in Engineering drawing.
A30301.2	Apply orthographic projection concepts to draw projections of points, lines, planes and solids.
A30301.3	Apply development concepts to draw development of surfaces of simple solids.
A30301.4	Apply isometric projection concepts to draw isometric projections of right regular solids
A30301.5	Apply orthographic projection concepts to convert isometric view to orthographic views
A30301.6	Apply orthographic projection concepts to convert isometric view to orthographic views.

Course name: **COMMUNICATIVE ENGLISH LABORATORY A30006** Course year:2020-21

A30006.1	Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
A30006.2	Apply communication skills through various language learning activities
A30006.3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
A30006.4	Evaluate and exhibit acceptable etiquette essential in social and professional settings
A30006.5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
A30006.6	Improve upon speaking skills over telephone, role plays and public speaking

Course name: **ENGINEERING PHYSICS LAB A30007** Course year:2020-21

A30007.1	Operate optical instruments like Travelling microscope and spectrometer
A30007.2	Understand the concepts of interference by finding thickness of paper, radius of curvature of Newton's rings
A30007.3	Interpret the concept of diffraction by the determination of wavelength of differentcolors of white light and dispersive power of grating
A30007.4	Plot the intensity of the magnetic field of circular coil carrying current with varyingdistance and B-H curve
A30007.5	Evaluate the acceptance angle of an optical fiber and numerical aperture
A30007.6	Determine the resistivity of the given semiconductor using four probe method, theband gap of a semiconductor

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CIVIL I-II

Course name: **MATHEMATICS-II** **A30010** Course year:2020-21

A30010.1	Apply the mathematical principles to solve second and higher order differential equations
A30010.2	Analyze the non- homogeneous linear differential equations along with method of variation of parameters.
A30010.3	Apply the concept of higher order differential equations to the various streams like Massspring system and L-C-R Circuit problems
A30010.4	Apply a range of techniques to find solutions of standard PDEs and basic properties of standard PDEs
A30010.5	Analyze the vector calculus involving divergence, curl and their properties along with vectoridentities
A30010.6	Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals

Course name: **ENGINEERING CHEMISTRY** **A30012** Course year:2020-21

A30012.1	To illustrate the molecular orbital energy levels for different molecular speciesand Apply Schrodinger wave equation and particle in a box.
A30012.2	To differentiate between pH metry, Potentiometric and conductometric titrations
A30012.3	Explain the preparation properties and applications of polymers anddescribe the mechanism of conduction in conducting polymers.
A30012.4	Understand the principles of different analytical instruments and explaintheir applications.
A30012.5	Explain the concept of nano clusters nano wires and characterize theapplications of SEM & TEM.
A30012.6	Explain of different types of colloids, their preparations, properties andapplications

Course name: **C AND DATA STRUCTURES** **A30505** Course year:2020-21

A30505.1	Apply fundamental programming concepts of C for solving general purpose problems
A30505.2	Implement functions for organized software development
A30505.3	Apply various operations on linear data structures
A30505.4	Design techniques for efficient searching and sorting of a given application
A30505.5	Develop programs on stacks and Queues for real time applications
A30505.6	Analyze Linear and nonlinear programming for efficiency

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Course name: **ENGINEERING MECHANICS A30303** Course year:2020-21

A30303.1	Analyze the basic concepts of rigid bodies subjected to different types of loads and supports
A30303.2	Analyze the motion of the bodies considering friction and external loads
A30303.3	Determine centroids, center of gravity, moment of inertia of simple and composite figures.
A30303.4	Analyze the motion of particle without considering forces and considering forces, develop equations for different motions
A30303.5	Apply Newton's laws and conservation laws to elastic collisions and motion of rigid bodies
A30303.6	Analyze the perfect frames using different methods and concepts of Mechanical vibrations

Course name: **ENGINEERING WORKSHOP A30302** Course year:2020-21

A30302.1	Apply wood working skills to make products
A30302.2	Perform metal cutting operations in the fitting section to make models
A30302.3	Perform simple welding operations to join to metal pieces
A30302.4	Apply sheet metal working skills to make required models
A30302.5	Evaluate the performance analysis of various pumps and turbines
A30302.6	Perform general maintenance works on own at house/ work place

Course name: **ENGINEERING CHEMISTRY LAB A30013** Course year:2020-21

A30013.1	Determine the cell constant and conductance of solutions
A30013.2	Prepare advanced polymer materials.
A30013.3	Determine the physical properties like surface tension, adsorption and viscosity
A30013.4	Estimate the Iron and Calcium in cement
A30013.5	Calculate the hardness of water and calculation of dissolved oxygen percentages
A30013.6	Determination of percentage of Iron in Cement sample by colorimetry

Course name: **C AND DATA STRUTURES LAB A30506** Course year:2020-21

A30506.1	Develop fundamental programs in C for solving general purpose problems
A30506.2	Implement functions for reusability and easy maintenance
A30506.3	Apply various operations on linear data structures.
A30506.4	Design techniques for efficient searching and sorting of a given application
A30506.5	Develop programs on stacks and Queues for real time applications
A30506.6	Apply Linear and nonlinear programming for efficiency.

Course name: **APPLIED MECHNICS LAB A30304** Course year:2020-21

A30304.1	Acquire knowledge of static and dynamic behavior of the bodies
A30304.2	Verify the Principle of moments using the bell crank lever apparatus.
A30304.3	Determine velocity ratio, mechanical advantage and efficiency of single and double gearcrab
A30304.4	Determine the velocity ratio of the machine and to interpret the law of machine
A30304.5	Analyze the coefficient of static friction between two surfaces
A30304.6	Apply laws of mechanics to determine efficiency of simple machines with considerationof friction.

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Course name: **UNIVERSAL HUMAN VALUES** **A30032** Course year:2020-21

A30032 .1	Understand the significance of value inputs in a classroom and start applying them in theirlife and profession
A30032 .2	Distinguish between values and skills, happiness and accumulation of physical facilities, theSelf and the Body, Intention and Competence of an individual, etc
A30032 .3	Understand the value of harmonious relationship based on trust and respect in their life andprofession
A30032 .4	Understand the role of a human being in ensuring harmony in society and nature.
A30032 .5	Distinguish between ethical and unethical practices, and start working out the strategy toactualize a harmonious environment wherever they work
A30032 .6	Analyze the value of maintaining ethical values in critical situations.

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REGULATION R20
COURSE OUTCOMES

MECH I-I

Course name: **MATHEMATICS -I** **A30002** Course year:2020-21

A30002.1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
A30002.2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
A30002.3	Utilize mean value theorems to real life problems.
A30002.4	Familiarize with functions of several variables which is useful in optimization.
A30002.5	Apply important tools of calculus in higher dimensions and will become familiar with 2-dimensional coordinate systems.
A30002.6	Analyze 3- dimensional coordinate systems and utilization of special functions.

Course name: **ENGNEERING PHYSICS A30004** Course year:2020-21

A30004.1	Understand the basic concepts of electrical elements.
A30004.2	Understand and analyses the basic laws.
A30004.3	Understand and apply the connections of series and parallel circuits
A30004.4	Understand and apply the KCL and KVL.
A30004.5	Understand and apply the basic wiring systems.
A30004.6	Demonstration of parts of DC and AC Machines.

Course name: **COMPUTER PROGRAMMING A30501** Course year:2020-21

A30501.1	Comprehend the fundamental concepts of computer hardware and problem solving Abilities
A30501.2	Knowledge on the basic concepts of algorithms, flow charts and python programming.
A30501.3	Ability to analyze the procedure for providing input and acquire output from theprogram along with implementation of control statements.
A30501.4	Interpret the importance of functions in programming
A30501.5	Analyze and modularize the problem and its solution by using functions.
A30501.6	Ability to relate the concepts of strings, files and pre-processors to the real-world Applications.

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Course name: **COMMUNICATIVE ENGLISH A30001** Course year:2020-21

A30001.1	Remember the concepts which the student has learnt previously and identify it heirconnection
A30001.2	Understand the context, topic, and pieces of specific information from social or Transactional dialogues spoken by native speakers of English
A30001.3	Apply grammatical structures to formulate sentences and correct word forms
A30001.4	Analyze discourse markers to speak clearly on a specific topic in informal discussions
A30001.5	Evaluate reading/listening texts and to write summaries based on globalprehension of these texts
A30001.6	Create a coherent paragraph interpreting a figure/graph/chart/table

Course name: **ENGINEERING GRAPHICS AND COMPUTER AIDED RAFTING A30301** Course year:2020-21

A30301.1	Construct various curves like ellipse, parabola, hyperbola etc which are used in Engineering drawing.
A30301.2	Apply orthographic projection concepts to draw projections of points, lines, planes and solids.
A30301.3	Apply development concepts to draw development of surfaces of simple solids.
A30301.4	Apply isometric projection concepts to draw isometric projections of right regular solids
A30301.5	Apply orthographic projection concepts to convert isometric view to orthographic views
A30301.6	Apply orthographic projection concepts to convert isometric view to orthographic views.

Course name: **COMMUNICATIVE ENGLISH LABORATORY A30006** Course year:2020-21

A30006.1	Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
A30006.2	Apply communication skills through various language learning activities
A30006.3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
A30006.4	Evaluate and exhibit acceptable etiquette essential in social and professional settings
A30006.5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
A30006.6	Improve upon speaking skills over telephone, role plays and public speaking

Course name: **ENGINEERING PHYSICS LAB A30007** Course year:2020-21

A30007.1	Operate optical instruments like Travelling microscope and spectrometer
A30007.2	Understand the concepts of interference by finding thickness of paper, radius of curvature of Newton's rings
A30007.3	Interpret the concept of diffraction by the determination of wavelength of differentcolors of white light and dispersive power of grating
A30007.4	Plot the intensity of the magnetic field of circular coil carrying current with varyingdistance and B-H curve
A30007.5	Evaluate the acceptance angle of an optical fiber and numerical aperture
A30007.6	Determine the resistivity of the given semiconductor using four probe method, theband gap of a semiconductor

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MECH I-II

Course name: **MATHEMATICS-II** **A30010** Course year:2020-21

A30010.1	Apply the mathematical principles to solve second and higher order differential equations
A30010.2	Analyze the non- homogeneous linear differential equations along with method of variation of parameters.
A30010.3	Apply the concept of higher order differential equations to the various streams like Massspring system and L-C-R Circuit problems
A30010.4	Apply a range of techniques to find solutions of standard PDEs and basic properties of standard PDEs
A30010.5	Analyze the vector calculus involving divergence, curl and their properties along with vectoridentities
A30010.6	Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals

Course name: **ENGINEERING CHEMISTRY** **A30012** Course year:2020-21

A30012.1	To illustrate the molecular orbital energy levels for different molecular speciesand Apply Schrodinger wave equation and particle in a box.
A30012.2	To differentiate between pH metry, Potentiometric and conductometric titrations
A30012.3	Explain the preparation properties and applications of polymers anddescribe the mechanism of conduction in conducting polymers.
A30012.4	Understand the principles of different analytical instruments and explaintheir applications.
A30012.5	Explain the concept of nano clusters nano wires and characterize theapplications of SEM & TEM.
A30012.6	Explain of different types of colloids, their preparations, properties andapplications

Course name: **C AND DATA STRUCTURES** **A30505** Course year:2020-21

A30505.1	Apply fundamental programming concepts of C for solving general purpose problems
A30505.2	Implement functions for organized software development
A30505.3	Apply various operations on linear data structures
A30505.4	Design techniques for efficient searching and sorting of a given application
A30505.5	Develop programs on stacks and Queues for real time applications
A30505.6	Analyze Linear and nonlinear programming for efficiency

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Course name: **ENGINEERING MECHANICS A30303** Course year:2020-21

A30303.1	Analyze the basic concepts of rigid bodies subjected to different types of loads and supports
A30303.2	Analyze the motion of the bodies considering friction and external loads
A30303.3	Determine centroids, center of gravity, moment of inertia of simple and composite figures.
A30303.4	Analyze the motion of particle without considering forces and considering forces, develop equations for different motions
A30303.5	Apply Newton's laws and conservation laws to elastic collisions and motion of rigid bodies
A30303.6	Analyze the perfect frames using different methods and concepts of Mechanical vibrations

Course name: **ENGINEERING WORKSHOP A30302** Course year:2020-21

A30302.1	Apply wood working skills to make products
A30302.2	Perform metal cutting operations in the fitting section to make models
A30302.3	Perform simple welding operations to join to metal pieces
A30302.4	Apply sheet metal working skills to make required models
A30302.5	Evaluate the performance analysis of various pumps and turbines
A30302.6	Perform general maintenance works on own at house/ work place

Course name: **ENGINEERING CHEMISTRY LAB A30013** Course year:2020-21

A30013.1	Determine the cell constant and conductance of solutions
A30013.2	Prepare advanced polymer materials.
A30013.3	Determine the physical properties like surface tension, adsorption and viscosity
A30013.4	Estimate the Iron and Calcium in cement
A30013.5	Calculate the hardness of water and calculation of dissolved oxygen percentages
A30013.6	Determination of percentage of Iron in Cement sample by colorimetry

Course name: **C AND DATA STRUTURES LAB A30506** Course year:2020-21

A30506.1	Develop fundamental programs in C for solving general purpose problems
A30506.2	Implement functions for reusability and easy maintenance
A30506.3	Apply various operations on linear data structures.
A30506.4	Design techniques for efficient searching and sorting of a given application
A30506.5	Develop programs on stacks and Queues for real time applications
A30506.6	Apply Linear and nonlinear programming for efficiency.

Course name: **APPLIED MECHNICS LAB A30304** Course year:2020-21

A30304.1	Acquire knowledge of static and dynamic behavior of the bodies
A30304.2	Verify the Principle of moments using the bell crank lever apparatus.
A30304.3	Determine velocity ratio, mechanical advantage and efficiency of single and double gearcrab
A30304.4	Determine the velocity ratio of the machine and to interpret the law of machine
A30304.5	Analyze the coefficient of static friction between two surfaces
A30304.6	Apply laws of mechanics to determine efficiency of simple machines with considerationof friction.

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Course name: **UNIVERSAL HUMAN VALUES** **A30032** Course year:2020-21

A30032 .1	Understand the significance of value inputs in a classroom and start applying them in theirlife and profession
A30032 .2	Distinguish between values and skills, happiness and accumulation of physical facilities, theSelf and the Body, Intention and Competence of an individual, etc
A30032 .3	Understand the value of harmonious relationship based on trust and respect in their life andprofession
A30032 .4	Understand the role of a human being in ensuring harmony in society and nature.
A30032 .5	Distinguish between ethical and unethical practices, and start working out the strategy toactualize a harmonious environment wherever they work
A30032 .6	Analyze the value of maintaining ethical values in critical situations.

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COURSE OUTCOMES

EEE I-I

Course name: **MATHEMATICS** **A30002** Course year:2020-21

A30002.1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
A30002.2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
A30002.3	Utilize mean value theorems to real life problems.
A30002.4	Familiarize with functions of several variables which is useful in optimization.
A30002.5	Apply important tools of calculus in higher dimensions and will become familiar with 2-dimensional coordinate systems.
A30002.6	Analyze 3- dimensional coordinate systems and utilization of special functions.

Course name: **CHEMISTRY** **A30005** Course year:2020-21

A30005.1	To illustrate the molecular orbital energy levels for different molecular species andApply Schrodinger wave equation and particle in a box.
A30005.2	To differentiate between pH metry, Potentiometric and conductometric titration.
A30005.3	Explain the preparation properties and applications of polymers and describe themechanism of conduction in conducting polymers.
A30005.4	Understand the principles of different analytical instruments and explain theirapplications.
A30005.5	Explain the concept of nano clusters nano wires and characterize the applicationsof SEM & TEM.
A30005.6	Explain of different types of colloids, their preparations, properties andapplications.

Course name: **PYTHON PROGRAMMING** **A30501** Course year:2020-21

A30501.1	Comprehend the fundamental concepts of computer hardware and problem-solving Abilities.
A30501.2	Knowledge on the basic concepts of algorithms, flow charts and python programming.
A30501.3	Ability to analyze the procedure for providing input and acquire output from theprogram along with implementation of control statements.
A30501.4	Interpret the importance of functions in programming
A30501.5	Analyze and modularize the problem and its solution by using functions.
A30501.6	Ability to relate the concepts of strings, files and pre-processors to the real-world Applications.

Course name: **FUNDAMENTALS OF ELECTRICAL ENGINEERING** **A30201** Course year:2020-21

A30201.1	Understand the basic concepts of magnetic circuits, electro magnetism andElectrostatics.
A30201.2	Understand and analyze DC circuits and their transformations.
A30201.3	Understand and analyze the concepts of AC fundamental circuits
A30201.4	Apply KCL and KVL for mesh and nodal analysis.
A30201.5	Understand the Knowledge of electromagnetism and its principles.
A30201.6	Understand the basic types of wires, cables, Batteries and wiring Systems

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Course name: **ENGINEERING WORK SHOP** **A30302** Course year:2020-21

A30302.1	Apply wood working skills to make products.
A30302.2	Perform metal cutting operations in the fitting section to make models.
A30302.3	Perform simple welding operations to join to metal pieces.
A30302.4	Apply sheet metal working skills to make required models.
A30302.5	Evaluate the performance analysis of various pumps and turbines.
A30302.6	Perform general maintenance works on own at house/ work Place.

Course name: **PYTHON PROGRAMMING LAB A30502** Course year:2020-21

A30502.1	Design solutions to mathematical problems & organize the data for solving the Problem.
A30502.2	Understand and implement modular approach using python
A30502.3	Learn and implement various data structures provided by python library includingstring, list, dictionary and its operations etc.
A30502.4	Understands about files and its applications
A30502.5	Develop real-world applications, files and exception handling provided by python
A30502.6	Select appropriate programming construct for solving the problem.

Course name: **CHEMISTRY LABORATORY A30009** Course year:2020-21

A30009.1	Understand the determine the cell constant and conductance of solutions.
A30009.2	Prepare advanced polymer materials.
A30009.3	Measure the strength of an acid present in secondary batteries
A30009.4	Understand and apply the pH metric titrations
A30009.5	Verify Lambert-Beer'slaw
A30009.6	Potentiometry - determination of redox potentials and EMFs

Course name: **FUNDAMENTALS OF ELECTRICAL ENGINEERING LAB A30009**

Course year:2020-21

A30202.1	Understand the basic concepts of electrical elements.
A30202.2	Understand and analyses the basic laws.
A30202.3	Understand and apply the connections of series and parallel circuits
A30202.4	Understand and apply the KCL and KVL.
A30202.5	Understand and apply the basic wiring systems.
A30202.6	Demonstration of parts of DC and AC Machines.

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EEE I-II

Course name: **MATHEMATICS-II** **A30010** Course year:2020-21

A30010.1	Understand the basic concepts of electrical elements.
A30010.2	Understand and analyses the basic laws.
A30010.3	Understand and apply the connections of series and parallel circuits
A30010.4	Understand and apply the KCL and KVL.
A30010.5	Understand and apply the basic wiring systems.
A30010.6	Demonstration of parts of DC and AC Machines.

Course name: **APPLIED PHYSICS** **A30004** Course year:2020-21

A30004.1	Understand the basic concepts of electrical elements.
A30004.2	Understand and analyses the basic laws.
A30004.3	Understand and apply the connections of series and parallel circuits
A30004.4	Understand and apply the KCL and KVL.
A30004.5	Understand and apply the basic wiring systems.
A30004.6	Demonstration of parts of DC and AC Machines.

Course name: **DATA STRUCTURE** **A30503** Course year:2020-21

A30004.1	Learn to choose appropriate data structure as applied to specified problem definition.
A30004.2	Design and analyze linear and non-linear data structures.
A30004.3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs.
A30004.4	Demonstrate advantages and disadvantages of specific algorithms and data Structures.
A30004.5	Develop programs for efficient data organization with reduce time complexity.
A30004.6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Course name: **COMMUNICATIVE ENGLISH** **A30001** Course year:2020-21

A30001.1	Remember the concepts which the student has learnt previously and identifying their connection Understand the basic concepts of electrical elements.
A30001.2	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English.
A30001.3	Apply grammatical structures to formulate sentences and correct word forms
A30001.4	Apply grammatical structures to formulate sentences and correct word forms
A30001.5	Evaluate reading/listening texts and to write summaries based on globalcomprehension of these texts.
A30001.6	6 Create a coherent paragraph interpreting a figure/graph/chart/table

Course name: ENGINEERING GRAPHICS AND COMPUTER AIDED RAFTING
A30301 **Course year:2020-21**

A30301.1	Construct various curves like ellipse, parabola, hyperbola etc which are used in Engineering drawing.
A30301.2	Apply orthographic projection concepts to draw projections of points, lines, planes and solids.
A30301.3	Apply development concepts to draw development of surfaces of simple solids.
A30301.4	Apply isometric projection concepts to draw isometric projections of right regular solids
A30301.5	Apply orthographic projection concepts to convert isometric view to orthographic views
A30301.6	Apply orthographic projection concepts to convert isometric view to orthographic views.

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Course name: **APPLIED PHYSICS LABORATORY A30008** Course year:2020-21

A30008.1	Operate optical instruments like Travelling microscope and spectrometer
A30008.2	Understand the concepts of interference by finding thickness of paper, radius of curvature of Newton's rings
A30008.3	Interpret the concept of diffraction by the determination of wavelength of differentcolors of white light and dispersive power of grating
A30008.4	Plot the intensity of the magnetic field of circular coil carrying current with varyingdistance and B-H curve
A30008.5	Evaluate the acceptance angle of an optical fiber and numerical aperture
A30008.6	Determine the resistivity of the given semiconductor using four probe method, theband gap of a semiconductor

Course name: **DATA STRUCTURES LABORATORY A30504** Course year:2020-21

A30504.1	Learn to choose appropriate data structure as applied to specified problem definition.
A30504.2	Design and analyze linear and non-linear data structures.
A30504.3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs.
A30504.4	Demonstrate advantages and disadvantages of specific algorithms and data Structures.
A30504.5	Develop programs for efficient data organization with reduce time complexity.
A30504.6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Course name: **COMMUNICATIVE ENGLISH LABORATORY A30006** course year:2020-21

A30006.1	Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
A30006.2	Apply communication skills through various language learning activities
A30006.3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
A30006.4	Evaluate and exhibit acceptable etiquette essential in social and professional settings
A30006.5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
A30006.6	Improve upon speaking skills over telephone, role plays and public speaking

Course name: **ENVIRONMENTAL SCIENCE A30031** course year:2020-21

A30031.1	Solve environmental problems through higher level of personal involvement and interest.
A30031.2	Apply ecological morals to keep up amicable connection among nature and human beings.
A30031.3	Recognize the interconnectedness of human dependence on the earth's ecosystems.
A30031.4	Apply environmental laws for the protection of environment and wildlife
A30031.5	Influence society in proper utilization of goods and services.

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R 20 REGULATION
COURSE OUTCOMES

ECE I-I

Course name: **MATHEMATICS** **A30002** Course year:2020-21

A30002.1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
A30002.2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
A30002.3	Utilize mean value theorems to real life problems.
A30002.4	Familiarize with functions of several variables which is useful in optimization.
A30002.5	Apply important tools of calculus in higher dimensions and will become familiar with 2-dimensional coordinate systems.
A30002.6	Analyze 3- dimensional coordinate systems and utilization of special functions.

Course name: **CHEMISTRY** **A30005** Course year:2020-21

A30005.1	To illustrate the molecular orbital energy levels for different molecular species andApply Schrodinger wave equation and particle in a box.
A30005.2	To differentiate between pH metry, Potentiometric and conductometric titration.
A30005.3	Explain the preparation properties and applications of polymers and describe themechanism of conduction in conducting polymers.
A30005.4	Understand the principles of different analytical instruments and explain theirapplications.
A30005.5	Explain the concept of nano clusters nano wires and characterize the applicationsof SEM & TEM.
A30005.6	Explain of different types of colloids, their preparations, properties andapplications.

Course name: **PYTHON PROGRAMMING** **A30501** Course year:2020-21

A30501.1	Comprehend the fundamental concepts of computer hardware and problem-solving Abilities.
A30501.2	Knowledge on the basic concepts of algorithms, flow charts and python programming.
A30501.3	Ability to analyze the procedure for providing input and acquire output from theprogram along with implementation of control statements.
A30501.4	Interpret the importance of functions in programming
A30501.5	Analyze and modularize the problem and its solution by using functions.
A30501.6	Ability to relate the concepts of strings, files and pre-processors to the real-world Applications.

Course name: **FUNDAMENTALS OF ELECTRICAL ENGINEERING** **A30201** Course year:2020-21

A30201.1	Understand the basic concepts of magnetic circuits, electro magnetism andElectrostatics.
A30201.2	Understand and analyze DC circuits and their transformations.
A30201.3	Understand and analyze the concepts of AC fundamental circuits
A30201.4	Apply KCL and KVL for mesh and nodal analysis.
A30201.5	Understand the Knowledge of electromagnetism and its principles.
A30201.6	Understand the basic types of wires, cables, Batteries and wiring Systems

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Course name: **ENGINEERING WORK SHOP** **A30302** Course year:2020-21

A30302.1	Apply wood working skills to make products.
A30302.2	Perform metal cutting operations in the fitting section to make models.
A30302.3	Perform simple welding operations to join to metal pieces.
A30302.4	Apply sheet metal working skills to make required models.
A30302.5	Evaluate the performance analysis of various pumps and turbines.
A30302.6	Perform general maintenance works on own at house/ work Place.

Course name: **PYTHON PROGRAMMING LAB A30502** Course year:2020-21

A30502.1	Design solutions to mathematical problems & organize the data for solving the Problem.
A30502.2	Understand and implement modular approach using python
A30502.3	Learn and implement various data structures provided by python library includingstring, list, dictionary and its operations etc.
A30502.4	Understands about files and its applications
A30502.5	Develop real-world applications, files and exception handling provided by python
A30502.6	Select appropriate programming construct for solving the problem.

Course name: **CHEMISTRY LABORATORY A30009** Course year:2020-21

A30009.1	Understand the determine the cell constant and conductance of solutions.
A30009.2	Prepare advanced polymer materials.
A30009.3	Measure the strength of an acid present in secondary batteries
A30009.4	Understand and apply the pH metric titrations
A30009.5	Verify Lambert-Beer'slaw
A30009.6	Potentiometry - determination of redox potentials and EMFs

Course name: **FUNDAMENTALS OF ELECTRICAL ENGINEERING LAB A30009**
Course year:2020-21

A30202.1	Understand the basic concepts of electrical elements.
A30202.2	Understand and analyses the basic laws.
A30202.3	Understand and apply the connections of series and parallel circuits
A30202.4	Understand and apply the KCL and KVL.
A30202.5	Understand and apply the basic wiring systems.
A30202.6	Demonstration of parts of DC and AC Machines.

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ECE I-II

Course name: **MATHEMATICS-II** **A30010** Course year:2020-21

A30010.1	Understand the basic concepts of electrical elements.
A30010.2	Understand and analyses the basic laws.
A30010.3	Understand and apply the connections of series and parallel circuits
A30010.4	Understand and apply the KCL and KVL.
A30010.5	Understand and apply the basic wiring systems.
A30010.6	Demonstration of parts of DC and AC Machines.

Course name: **APPLIED PHYSICS** **A30004** Course year:2020-21

A30004.1	Understand the basic concepts of electrical elements.
A30004.2	Understand and analyses the basic laws.
A30004.3	Understand and apply the connections of series and parallel circuits
A30004.4	Understand and apply the KCL and KVL.
A30004.5	Understand and apply the basic wiring systems.
A30004.6	Demonstration of parts of DC and AC Machines.

Course name: **DATA STRUCTURE** **A30503** Course year:2020-21

A30004.1	Learn to choose appropriate data structure as applied to specified problem definition.
A30004.2	Design and analyze linear and non-linear data structures.
A30004.3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs.
A30004.4	Demonstrate advantages and disadvantages of specific algorithms and data Structures.
A30004.5	Develop programs for efficient data organization with reduce time complexity.
A30004.6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Course name: **COMMUNICATIVE ENGLISH** **A30001** Course year:2020-21

A30001.1	Remember the concepts which the student has learnt previously and identifying their connection Understand the basic concepts of electrical elements.
A30001.2	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English.
A30001.3	Apply grammatical structures to formulate sentences and correct word forms
A30001.4	Apply grammatical structures to formulate sentences and correct word forms
A30001.5	Evaluate reading/listening texts and to write summaries based on globalcomprehension of these texts.
A30001.6	6 Create a coherent paragraph interpreting a figure/graph/chart/table

Course name: **ENGINEERING GRAPHICS AND COMPUTER AIDED RAFTING** **A30301** Course year:2020-21

A30301.1	Construct various curves like ellipse, parabola, hyperbola etc which are used in Engineering drawing.
A30301.2	Apply orthographic projection concepts to draw projections of points, lines, planes and solids.
A30301.3	Apply development concepts to draw development of surfaces of simple solids.
A30301.4	Apply isometric projection concepts to draw isometric projections of right regular solids
A30301.5	Apply orthographic projection concepts to convert isometric view to orthographic views
A30301.6	Apply orthographic projection concepts to convert isometric view to orthographic views.

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Course name: **APPLIED PHYSICS LABORATORY A30008** Course year:2020-21

A30008.1	Operate optical instruments like Travelling microscope and spectrometer
A30008.2	Understand the concepts of interference by finding thickness of paper, radius of curvature of Newton's rings
A30008.3	Interpret the concept of diffraction by the determination of wavelength of differentcolors of white light and dispersive power of grating
A30008.4	Plot the intensity of the magnetic field of circular coil carrying current with varyingdistance and B-H curve
A30008.5	Evaluate the acceptance angle of an optical fiber and numerical aperture
A30008.6	Determine the resistivity of the given semiconductor using four probe method, theband gap of a semiconductor

Course name: **DATA STRUCTURES LABORATORY A30504** Course year:2020-21

A30504.1	Learn to choose appropriate data structure as applied to specified problem definition.
A30504.2	Design and analyze linear and non-linear data structures.
A30504.3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs.
A30504.4	Demonstrate advantages and disadvantages of specific algorithms and data Structures.
A30504.5	Develop programs for efficient data organization with reduce time complexity.
A30504.6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Course name: **COMMUNICATIVE ENGLISH LABORATORY A30006** course year:2020-21

A30006.1	Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
A30006.2	Apply communication skills through various language learning activities
A30006.3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
A30006.4	Evaluate and exhibit acceptable etiquette essential in social and professional settings
A30006.5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
A30006.6	Improve upon speaking skills over telephone, role plays and public speaking

Course name: **ENVIRONMENTAL SCIENCE A30031** course year:2020-21

A30031.1	Solve environmental problems through higher level of personal involvement and interest.
A30031.2	Apply ecological morals to keep up amicable connection among nature and human beings.
A30031.3	Recognize the interconnectedness of human dependence on the earth's ecosystems.
A30031.4	Apply environmental laws for the protection of environment and wildlife
A30031.5	Influence society in proper utilization of goods and services.

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R20 REGULATION
COURSE OUTCOMES

CSE I-I

Course name: **MATHEMATICS** **A30002** Course year:2020-21

A30002.1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
A30002.2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
A30002.3	Utilize mean value theorems to real life problems.
A30002.4	Familiarize with functions of several variables which is useful in optimization.
A30002.5	Apply important tools of calculus in higher dimensions and will become familiar with 2-dimensional coordinate systems.
A30002.6	Analyze 3- dimensional coordinate systems and utilization of special functions.

Course name: **APPLIED PHYSICS** **A30004** Course year:2020-21

A30004.1	Interpret the properties of light waves and its interaction of energy with the matter
A30004.2	Explain the principles of physics in dielectrics and magnetic materials
A30004.3	Apply electromagnetic wave propagation in different guided media
A30004.4	Calculate conductivity of semiconductors
A30004.5	Interpret the difference between normal conductor and super conductor
A30004.6	Elucidate the applications of nano materials

Course name: **PYTHON PROGRAMMING** **A30501** Course year:2020-21

A30501.1	Comprehend the fundamental concepts of computer hardware and problem solving Abilities.
A30501.2	Knowledge on the basic concepts of algorithms, flow charts and python programming.
A30501.3	Ability to analyze the procedure for providing input and acquire output from theprogram along with implementation of control statements.
A30501.4	Interpret the importance of functions in programming
A30501.5	Analyze and modularize the problem and its solution by using functions.
A30501.6	Ability to relate the concepts of strings, files and pre-processors to the real-world Applications.

Course name: **COMMUNICATIVE ENGLISH** **A30001** Course year:2020-21

A30001.1	Remember the concepts which the student has learnt previously and identifying heir connection
A30001.2	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
A30001.3	Apply grammatical structures to formulate sentences and correct word forms
A30001.4	Analyze discourse markers to speak clearly on a specific topic in informal discussions
A30001.5	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
A30001.6	Create a coherent paragraph interpreting a figure/graph/chart/table

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Course name: **ENGINEERING GRAPHICS AND COMPUTER AIDED DRAFTING**

A30301 Course year:2020-21

A30301.1	Construct various curves like ellipse, parabola, hyperbola etc which are used in Engineering drawing.
A30301.2	Apply orthographic projection concepts to draw projections of points, lines, planes and solids.
A30301.3	Apply development concepts to draw development of surfaces of simple solids.
A30301.4	Apply isometric projection concepts to draw isometric projections of right regular solids
A30301.5	Apply orthographic projection concepts to convert isometric view to orthographic views.
A30301.6	Make use of AutoCAD Software to draw 2D diagrams of various objects

Course name: **COMMUNICATIVE ENGLISH LAB A30006** Course year:2020-21

A30006.1	Remember and understand the different aspects of the English languageproficiency with emphasis on LSRW skills
A30006.2	Apply communication skills through various language learning activities
A30006.3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension
A30006.4	Evaluate and exhibit acceptable etiquette essential in social and professionalsettings
A30006.5	Create awareness on mother tongue influence and neutralize it in order toimprove fluency in spoken English.
A30006.6	Improve upon speaking skills over telephone, role plays and public speaking

Course name: **APPLIED PHYSICS LABORATORY A30008** Course year:2020-21

A30008.1	Operate optical instruments like Travelling microscope and spectrometer
A30008.2	Understand the concepts of interference by finding thickness of paper, radius ofcurvature of Newton's rings
A30008.3	Interpret the concept of diffraction by the determination of wavelength of differentcolors of white light and dispersive power of grating
A30008.4	Plot the intensity of the magnetic field of circular coil carrying current with varyingdistance and B-H curve
A30008.5	Evaluate the acceptance angle of an optical fiber and numerical aperture
A30008.6	Determine the resistivity of the given semiconductor using four probe method, theband gap of a semiconductor

Course name: **PYTHON PROGRAMMING LAB A30502** Course year:2020-21

A30502.1	Design solutions to mathematical problems & organize the data for solving the Problem.
A30502.2	Understand and implement modular approach using python
A30502.3	Learn and implement various data structures provided by python library including string, list, dictionary and its operations etc.
A30502.4	Understands about files and its applications
A30502.5	Develop real-world applications, files and exception handling provided by python
A30502.6	Select appropriate programming construct for solving the problem.

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CSAI I-II

Course name: **MATHEMATICS-II** **A30010** Course year:2020-21

A30010.1	Understand the basic concepts of electrical elements.
A30010.2	Understand and analyses the basic laws.
A30010.3	Understand and apply the connections of series and parallel circuits
A30010.4	Understand and apply the KCL and KVL.
A30010.5	Understand and apply the basic wiring systems.
A30010.6	Demonstration of parts of DC and AC Machines.

Course name: **CHEMMISTRY** **A30005** Course year:2020-21

A30005.1	To illustrate the molecular orbital energy levels for different molecular species andApply Schrodinger wave equation and particle in a box.
A30005.2	To differentiate between pH metry, Potentiometric and conductometric titration.
A30005.3	Explain the preparation properties and applications of polymers and describe themechanism of conduction in conducting polymers.
A30005.4	Understand the principles of different analytical instruments and explain theirapplications.
A30005.5	Explain the concept of nano clusters nano wires and characterize the applicationsof SEM & TEM.
A30005.6	Explain of different types of colloids, their preparations, properties andapplications.

Course name: **DATA STRUCTURE USING C** **A30101** Course year:2020-21

A30101.1	Learn to choose appropriate data structure as applied to specified problem definition.
A30101.2	Design and analyze linear and non-linear data structures.
A30101.3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs.
A30101.4	Demonstrate advantages and disadvantages of specific algorithms and data Structures.
A30101.5	Develop programs for efficient data organization with reduce time complexity.
A30101.6	Evaluate algorithms and data structures in terms of time and memory complexity of basicoperations.

Course name: **FUNDAMENTALS OF ARTIFICIAL INTELIGENCE A30001** Course year:2020-21

A30001.1	An ability to analyze a problem, identify and define the computing requirementsappropriate to its solution.
A30001.2	An ability to design, implement and evaluate a system / computer based ystemprocess, component or program to meet desired needs
A30001.3	An ability to identify, formulate and solve engineering problems using the conceptsof Artificial Intelligence.
A30001.4	Design and conduct experiments as well as analyze and interpret data usingMachine Learning Algorithms
A30001.5	An ability to use current techniques and skills necessary for computing andengineering practice
A30001.6	Get familiarized with the tools mandatory for handling problem solving techniques

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Course name: **ENGINEERING WORKSHOP A30302** Course year:2020-21

A30302.1	Apply wood working skills to make products.
A30302.2	Perform metal cutting operations in the fitting section to make models
A30302.3	Perform simple welding operations to join to metal pieces
A30302.4	Apply sheet metal working skills to make required models
A30302.5	Evaluate the performance analysis of various pumps and turbines.
A30302.6	Perform general maintenance works on own at house/ work place

Course name: **CHEMISTRY LAB A30009** Course year:2020-21

A30009.1	Understand the determine the cell constant and conductance of solutions.
A30009.2	Prepare advanced polymer materials.
A30009.3	Measure the strength of an acid present in secondary batteries
A30009.4	Understand and apply the pH metric titrations
A30009.5	Verify Lambert-Beer'slaw
A30009.6	Potentiometry - determination of redox potentials and EMFs

Course name: **DATA STRUCTURES LABORATORY A30504** Course year:2020-21

A30504.1	Learn to choose appropriate data structure as applied to specified problem definition.
A30504.2	Design and analyse linear and non-linear data structures.
A30504.3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs.
A30504.4	Demonstrate advantages and disadvantages of specific algorithms and data Structures.
A30504.5	Develop programs for efficient data organisation with reduce time complexity.
A30504.6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Course name: **BASIC ARTFICIAL INTELLIGENCE LAB A33102** Course year:2020-21

A33102.1	Execute statistical problems to produce appropriate solutions
A33102.2	Categorize the problem for selection of an appropriate algorithm
A33102.3	Compare computational complexity of AI problems for better efficiency
A33102.4	Demonstrate various AI algorithms based on empirical and theoretical proofs forperformance statistics
A33102.5	An ability to use current techniques and skills necessary for computing andengineering practice
A33102.6	Get familiarized with the tools mandatory for handling problem solving techniques

Course name: **UNIVERSAL HUMAN VALUES A30032** course year:2020-21

A30032.1	Understand the significance of value inputs in a classroom and start applying them intheir life and profession
A30032.2	Distinguish between values and skills, happiness and accumulation of physical facilities,the Self and the Body, Intention and Competence of an individual, etc.
A30032.3	Understand the value of harmonious relationship based on trust and respect in their lifeand profession
A30032.4	Understand the role of a human being in ensuring harmony in society and nature.
A30032.5	Distinguish between ethical and unethical practices, and start working out the strategy toactualize a harmonious environment wherever they work.
A30032.6	Analyze the value of maintaining ethical values in critical situations

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COURSE OUTCOMES

CSE I-I

Course name: **MATHEMATICS** **A30002** Course year:2020-21

A30002.1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
A30002.2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
A30002.3	Utilize mean value theorems to real life problems.
A30002.4	Familiarize with functions of several variables which is useful in optimization.
A30002.5	Apply important tools of calculus in higher dimensions and will become familiar with 2-dimensional coordinate systems.
A30002.6	Analyze 3- dimensional coordinate systems and utilization of special functions.

Course name: **APPLIED PHYSICS** **A30004** Course year:2020-21

A30004.1	Interpret the properties of light waves and its interaction of energy with the matter
A30004.2	Explain the principles of physics in dielectrics and magnetic materials
A30004.3	Apply electromagnetic wave propagation in different guided media
A30004.4	Calculate conductivity of semiconductors
A30004.5	Interpret the difference between normal conductor and super conductor
A30004.6	Elucidate the applications of nano materials

Course name: **PYTHON PROGRAMMING** **A30501** Course year:2020-21

A30501.1	Comprehend the fundamental concepts of computer hardware and problem solving Abilities.
A30501.2	Knowledge on the basic concepts of algorithms, flow charts and python programming.
A30501.3	Ability to analyze the procedure for providing input and acquire output from theprogram along with implementation of control statements.
A30501.4	Interpret the importance of functions in programming
A30501.5	Analyze and modularize the problem and its solution by using functions.
A30501.6	Ability to relate the concepts of strings, files and pre-processors to the real-world Applications.

Course name: **COMMUNICATIVE ENGLISH** **A30001** Course year:2020-21

A30001.1	Remember the concepts which the student has learnt previously and identifying heir connection
A30001.2	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
A30001.3	Apply grammatical structures to formulate sentences and correct word forms
A30001.4	Analyze discourse markers to speak clearly on a specific topic in informal discussions
A30001.5	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts
A30001.6	Create a coherent paragraph interpreting a figure/graph/chart/table

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Course name: **ENGINEERING GRAPHICS AND COMPUTER AIDED DRAFTING**
A30301 Course year:2020-21

A30301.1	Construct various curves like ellipse, parabola, hyperbola etc which are used in Engineering drawing.
A30301.2	Apply orthographic projection concepts to draw projections of points, lines, planes and solids.
A30301.3	Apply development concepts to draw development of surfaces of simple solids.
A30301.4	Apply isometric projection concepts to draw isometric projections of right regular solids
A30301.5	Apply orthographic projection concepts to convert isometric view to orthographic views.
A30301.6	Make use of AutoCAD Software to draw 2D diagrams of various objects

Course name: **COMMUNICATIVE ENGLISH LAB A30006** Course year:2020-21

A30006.1	Remember and understand the different aspects of the English languageproficiency with emphasis on LSRW skills
A30006.2	Apply communication skills through various language learning activities
A30006.3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension
A30006.4	Evaluate and exhibit acceptable etiquette essential in social and professionalsettings
A30006.5	Create awareness on mother tongue influence and neutralize it in order toimprove fluency in spoken English.
A30006.6	Improve upon speaking skills over telephone, role plays and public speaking

Course name: **APPLIED PHYSICS LABORATORY A30008** Course year:2020-21

A30008.1	Operate optical instruments like Travelling microscope and spectrometer
A30008.2	Understand the concepts of interference by finding thickness of paper, radius ofcurvature of Newton's rings
A30008.3	Interpret the concept of diffraction by the determination of wavelength of differentcolors of white light and dispersive power of grating
A30008.4	Plot the intensity of the magnetic field of circular coil carrying current with varyingdistance and B-H curve
A30008.5	Evaluate the acceptance angle of an optical fiber and numerical aperture
A30008.6	Determine the resistivity of the given semiconductor using four probe method, theband gap of a semiconductor

Course name: **PYTHON PROGRAMMING LAB A30502** Course year:2020-21

A30502.1	Design solutions to mathematical problems & organize the data for solving the Problem.
A30502.2	Understand and implement modular approach using python
A30502.3	Learn and implement various data structures provided by python library including string, list, dictionary and its operations etc.
A30502.4	Understands about files and its applications
A30502.5	Develop real-world applications, files and exception handling provided by python
A30502.6	Select appropriate programming construct for solving the problem.

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CSAI I-II

Course name: **MATHEMATICS-II** **A30010** Course year:2020-21

A30010.1	Understand the basic concepts of electrical elements.
A30010.2	Understand and analyses the basic laws.
A30010.3	Understand and apply the connections of series and parallel circuits
A30010.4	Understand and apply the KCL and KVL.
A30010.5	Understand and apply the basic wiring systems.
A30010.6	Demonstration of parts of DC and AC Machines.

Course name: **CHEMMISTRY** **A30005** Course year:2020-21

A30005.1	To illustrate the molecular orbital energy levels for different molecular species andApply Schrodinger wave equation and particle in a box.
A30005.2	To differentiate between pH metry, Potentiometric and conductometric titration.
A30005.3	Explain the preparation properties and applications of polymers and describe themechanism of conduction in conducting polymers.
A30005.4	Understand the principles of different analytical instruments and explain theirapplications.
A30005.5	Explain the concept of nano clusters nano wires and characterize the applicationsof SEM & TEM.
A30005.6	Explain of different types of colloids, their preparations, properties andapplications.

Course name: **DATA STRUCTURE USING C** **A30101** Course year:2020-21

A30101.1	Learn to choose appropriate data structure as applied to specified problem definition.
A30101.2	Design and analyze linear and non-linear data structures.
A30101.3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs.
A30101.4	Demonstrate advantages and disadvantages of specific algorithms and data Structures.
A30101.5	Develop programs for efficient data organization with reduce time complexity.
A30101.6	Evaluate algorithms and data structures in terms of time and memory complexity of basicoperations.

Course name: **FUNDAMENTALS OF ARTIFICIAL INTELIGENCE A30001** Course year:2020-21

A30001.1	An ability to analyze a problem, identify and define the computing requirementsappropriate to its solution.
A30001.2	An ability to design, implement and evaluate a system / computer based ystemprocess, component or program to meet desired needs
A30001.3	An ability to identify, formulate and solve engineering problems using the conceptsof Artificial Intelligence.
A30001.4	Design and conduct experiments as well as analyze and interpret data usingMachine Learning Algorithms
A30001.5	An ability to use current techniques and skills necessary for computing andengineering practice
A30001.6	Get familiarized with the tools mandatory for handling problem solving techniques

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Course name: **ENGINEERING WORKSHOP A30302** Course year:2020-21

A30302.1	Apply wood working skills to make products.
A30302.2	Perform metal cutting operations in the fitting section to make models
A30302.3	Perform simple welding operations to join to metal pieces
A30302.4	Apply sheet metal working skills to make required models
A30302.5	Evaluate the performance analysis of various pumps and turbines.
A30302.6	Perform general maintenance works on own at house/ work place

Course name: **CHEMISTRY LAB A30009** Course year:2020-21

A30009.1	Understand the determine the cell constant and conductance of solutions.
A30009.2	Prepare advanced polymer materials.
A30009.3	Measure the strength of an acid present in secondary batteries
A30009.4	Understand and apply the pH metric titrations
A30009.5	Verify Lambert-Beer'slaw
A30009.6	Potentiometry - determination of redox potentials and EMFs

Course name: **DATA STRUCTURES LABORATORY A30504** Course year:2020-21

A30504.1	Learn to choose appropriate data structure as applied to specified problem definition.
A30504.2	Design and analyse linear and non-linear data structures.
A30504.3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs.
A30504.4	Demonstrate advantages and disadvantages of specific algorithms and data Structures.
A30504.5	Develop programs for efficient data organisation with reduce time complexity.
A30504.6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Course name: **BASIC ARTFICIAL INTELLIGENCE LAB A33102** Course year:2020-21

A33102.1	Execute statistical problems to produce appropriate solutions
A33102.2	Categorize the problem for selection of an appropriate algorithm
A33102.3	Compare computational complexity of AI problems for better efficiency
A33102.4	Demonstrate various AI algorithms based on empirical and theoretical proofs forperformance statistics
A33102.5	An ability to use current techniques and skills necessary for computing andengineering practice
A33102.6	Get familiarized with the tools mandatory for handling problem solving techniques

Course name: **UNIVERSAL HUMAN VALUES A30032** course year:2020-21

A30032.1	Understand the significance of value inputs in a classroom and start applying them intheir life and profession
A30032.2	Distinguish between values and skills, happiness and accumulation of physical facilities,the Self and the Body, Intention and Competence of an individual, etc.
A30032.3	Understand the value of harmonious relationship based on trust and respect in their lifeand profession
A30032.4	Understand the role of a human being in ensuring harmony in society and nature.
A30032.5	Distinguish between ethical and unethical practices, and start working out the strategy toactualize a harmonious environment wherever they work.
A30032.6	Analyze the value of maintaining ethical values in critical situations

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R20 REGULATION
COURSE OUTCOMES

CSE(IOT)I-I

Course name: **MATHEMATICS** **A30002** Course year:2020-21

A30002.1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
A30002.2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
A30002.3	Utilize mean value theorems to real life problems.
A30002.4	Familiarize with functions of several variables which is useful in optimization.
A30002.5	Apply important tools of calculus in higher dimensions and will become familiar with 2-dimensional coordinate systems.
A30002.6	Analyze 3- dimensional coordinate systems and utilization of special functions.

Course name: **CHEMISTRY** **A30005** Course year:2020-21

A30005.1	To illustrate the molecular orbital energy levels for different molecular species andApply Schrodinger wave equation and particle in a box.
A30005.2	To differentiate between pH metry, Potentiometric and conductometric titration.
A30005.3	Explain the preparation properties and applications of polymers and describe themechanism of conduction in conducting polymers.
A30005.4	Understand the principles of different analytical instruments and explain theirapplications.
A30005.5	Explain the concept of nano clusters nano wires and characterize the applicationsof SEM & TEM.
A30005.6	Explain of different types of colloids, their preparations, properties andapplications.

Course name: **PYTHON PROGRAMMING** **A30501** Course year:2020-21

A30501.1	Comprehend the fundamental concepts of computer hardware and problem solving Abilities.
A30501.2	Knowledge on the basic concepts of algorithms, flow charts and python programming.
A30501.3	Ability to analyze the procedure for providing input and acquire output from theprogram along with implementation of control statements.
A30501.4	Interpret the importance of functions in programming
A30501.5	Analyze and modularize the problem and its solution by using functions.
A30501.6	Ability to relate the concepts of strings, files and pre-processors to the real-world Applications.

Course name: **FOUNDATIONS FOR IOT** **A33501** Course year:2020-21

A33501.1	An ability to analyze a problem, identify and define the computing requirements appropriate to its solution.
A33501.2	An ability to design, implement and evaluate a system / computer-based system process, component or program to meet desired needs
A33501.3	An ability to identify, formulate and solve engineering problems using the concepts of Artificial Intelligence.
A33501.4	Design and conduct experiments as well as analyze and interpret data using Machine Learning Algorithms
A33501.5	An ability to use current techniques and skills necessary for computing and engineering practice
A33501.6	Get familiarized with the tools mandatory for handling problem solving techniques

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Course name: **ENGINEERING WORK SHOP A30302** Course year:2020-21

A30302.1	Apply wood working skills to make products.
A30302.2	Perform metal cutting operations in the fitting section to make models.
A30302.3	Perform simple welding operations to join to metal pieces.
A30302.4	Apply sheet metal working skills to make required models.
A30302.5	Evaluate the performance analysis of various pumps and turbines.
A30302.6	Perform general maintenance works on own at house/ work Place.

Course name: **PYTHON PROGRAMMING LAB A30502** Course year:2020-21

A30502.1	Design solutions to mathematical problems & organize the data for solving the Problem.
A30502.2	Understand and implement modular approach using python
A30502.3	Learn and implement various data structures provided by python library includingstring, list, dictionary and its operations etc.
A30502.4	Understands about files and its applications
A30502.5	Develop real-world applications, files and exception handling provided by python
A30502.6	Select appropriate programming construct for solving the problem.

Course name: **CHEMISTRY LABORATORY A30009** Course year:2020-21

A30009.1	Understand the determine the cell constant and conductance of solutions.
A30009.2	Prepare advanced polymer materials.
A30009.3	Measure the strength of an acid present in secondary batteries
A30009.4	Understand and apply the pH metric titrations
A30009.5	Verify Lambert-Beer'slaw
A30009.6	Potentiometry - determination of redox potentials and EMFs

Course name: **FUNDATIONS FOR IOT LAB A30502** Course year:2020-21

A30502.1	Analyze the basic laws and usage of components in electric circuits.
A30502.2	Analyze the principle of operation of DC machines and AC machines along with the various tests to predetermine the efficiency and regulation.
A30502.3	Analyze building blocks of Internet of Things and characteristics.
A30502.4	Understand the theory, operation and applications of semiconductor devices.
A30502.5	Determine various parameters of rectifier circuits using with and without filters
A30502.6	Analyze and Design different oscillator circuits, op-amps and the characteristics of BJT, FET to meet the given specifications.

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CSE(IOT) I-II

Course name: **MATHEMATICS-II** **A30010** Course year:2020-21

A30010.1	Apply the mathematical principles to solve second and higher order differential equations.
A30010.2	Analyze the non- homogeneous linear differential equations along with method of variation of parameters.
A30010.3	Apply the concept of higher order differential equations to the various streams like Mass spring system and L-C-R Circuit problems.
A30010.4	Apply a range of techniques to find solutions of standard PDEs and basic properties of standard PDEs.
A30010.5	Analyze the vector calculus involving divergence, curl and their properties along with vector identities.
A30010.6	Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals.

Course name: **APPLIED PHYSICS** **A30004** Course year:2020-21

A30004.1	Interpret the properties of light waves and its interaction of energy with the matter
A30004.2	Explain the principles of physics in dielectrics and magnetic materials
A30004.3	Apply electromagnetic wave propagation in different guided media
A30004.4	Calculate conductivity of semiconductors
A30004.5	Interpret the difference between normal conductor and super conductor
A30004.6	Elucidate the applications of nano materials

Course name: **DATA STRUCTURE** **A30503** Course year:2020-21

A30503.1	Learn to choose appropriate data structure as applied to specified problem definition.
A30503.2	Design and analyze linear and non-linear data structures.
A30503.3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs.
A30503.4	Demonstrate advantages and disadvantages of specific algorithms and data Structures.
A30503.5	Develop programs for efficient data organization with reduce time complexity.
A30503.6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Course name: **COMMUNICATIVE ENGLISH** **A30001** Course year:2020-21

A30001.1	Remember the concepts which the student has learnt previously and identifying their connection Understand the basic concepts of electrical elements.
A30001.2	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English.
A30001.3	Apply grammatical structures to formulate sentences and correct word forms
A30001.4	Apply grammatical structures to formulate sentences and correct word forms
A30001.5	Evaluate reading/listening texts and to write summaries based on globalcomprehension of these texts.
A30001.6	Create a coherent paragraph interpreting a figure/graph/chart/table

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Course name: **ENGINEERING GRAPHICS AND COMPUTER AIDED RAFTING**

A30301 course year:2020-21

A30301.1	Construct various curves like ellipse, parabola, hyperbola etc which are used in Engineering drawing.
A30301.2	Apply orthographic projection concepts to draw projections of points, lines, planes and solids.
A30301.3	Apply development concepts to draw development of surfaces of simple solids.
A30301.4	Apply isometric projection concepts to draw isometric projections of right regular solids
A30301.5	Apply orthographic projection concepts to convert isometric view to orthographic views
A30301.6	Apply orthographic projection concepts to convert isometric view to orthographic views.

Course name: **APPLIED PHYSICS LABORATORY A30008** Course year:2020-21

A30008.1	Operate optical instruments like Travelling microscope and spectrometer
A30008.2	Understand the concepts of interference by finding thickness of paper, radius of curvature ofNewton's rings
A30008.3	Interpret the concept of diffraction by the determination of wavelength of differentcolors of white light and dispersive power of grating
A30008.4	Plot the intensity of the magnetic field of circular coil carrying current with varyingdistance and B-H curve
A30008.5	Evaluate the acceptance angle of an optical fiber and numerical aperture
A30008.6	Determine the resistivity of the given semiconductor using four probe method, theband gap of a semiconductor

Course name: **DATA STRUCTURES LABY A30504** course year:2020-21

A30504.1	Learn to choose appropriate data structure as applied to specified problem definition.
A30504.2	Design and analyse linear and non-linear data structures.
A30504.3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs.
A30504.4	Demonstrate advantages and disadvantages of specific algorithms and data Structures.
A30504.5	Develop programs for efficient data organisation with reduce time complexity.
A30504.6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

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Course name: **COMMUNICATIVE ENGLISH LAB A30006** course year:2020-21

A30006.1	Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
A30006.2	Apply communication skills through various language learning activities
A30006.3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
A30006.4	Evaluate and exhibit acceptable etiquette essential in social and professional settings
A30006.5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
A30006.6	Improve upon speaking skills over telephone, role plays and public speaking

Course name: **ENVIRONMENTAL SCIENCE A30031** course year:2020-21

A30031.1	Solve environmental problems through higher level of personal involvement and interest.
A30031.2	Apply ecological morals to keep up amicable connection among nature and human beings.
A30031.3	Recognize the interconnectedness of human dependence on the earth's ecosystems.
A30031.4	Apply environmental laws for the protection of environment and wildlife
A30031.5	Influence society in proper utilization of goods and services.

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REGULATION R19
COURSE OUTCOMES

CIVIL II-I

Course name: **TRANSFORM TECHNIQUES AD NUMERICAL METHODS A2014**
Course year:2020-21

A2014.1	Apply Laplace transforms to solve ordinary differential equations
A2014.2	Build Fourier series and Fourier transforms of a given function
A2014.3	Apply numerical methods to solve algebraic and transcendental equations
A2014.4	Familiarize with functions of several variables which is useful in optimization.
A2014.5	Derive interpolating polynomials using interpolation formulae
A2014.6	Solve differential and integral equations numerically

Course name: **STRENGTH OF MATERIALS -I A2101** Course year:2020-21

A2101.1	Interpret simple stresses and strains to find out various properties of materials
A2101.2	Develop bending moment and shear force diagrams of beams subjected to different Loading conditions
A2101.3	Compute flexural and shear stresses across various sections to plot the stressdistribution envelops
A2101.4	Apply various theorems such as Mohr's, Double integration, Conjugate beam etc.,to find slope and deflections of beams
A2101.5	Analyze the direct and bending stresses on various structural elements for stabilitycondition

Course name: **SURVEYING A2102** Course year:2020-21

A2102.1	Compute Linear measurement and angles using compasses, chain to prepare plansand maps
A2102.2	Determine elevations of station points along the irregular intervals to preparecontour maps and to calculate the volume of earth work
A2102.3	Measure horizontal angles by Theodolite for a traverse to find areas and elevations
A2102.4	Apply surveying principles for setting out simple curves by using different methodsand Compare fixed and movable hair method in tachometric surveying
A2102.5	Make use of advanced surveying instruments to solve Construction problems

Course name: **BUILDING MATERAILS AND CONSTRUTION A2103**
Course year:2020-21

A2103.1	Identify suitable materials to be used for construction works
A2103.2	Make use of sustainable materials for eco-friendly construction
A2103.3	Interpret various insulating materials for thermal and sound proof construction
A2103.4	Categorize various structural components employed in civil engineering structures
A2103.5	Identify different internal construction activities for the finishing works

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Course name: **MECHANICS IF FLUIDS** **A2104** Course year:2020-21

A2104.1	Make use of conservation laws of mass, momentum and energy to find propertiesof fluids
A2104.2	Compute the force of buoyancy on submerged and floating bodies to locate metacenter
A2104.3	Apply Euler's and Bernoulli's equation to find the characteristics of fluid in motion
A2104.4	Identify various flow measuring devices to find the coefficient of discharge
A2104.5	Evaluate minor and major energy losses to solve complex pipe network systems

Course name: **ENGINEERING GEOLOGY** **A2105** Course year:2020-21

A2105.1	Identify various types of rocks by their physical properties
A2105.2	Classify different types of rocks by their origins
A2105.3	Judge the suitability of sites for various civil engineering structures
A2105.4	Estimate the depth of location of rocks and water table by using different methods
A2105.5	Make use of the geological strata knowledge in the analysis and design the civilengineering structures

Course name: **STRENGTH OF MATERIALS LAB** **A2106** Course year:2020-21

A2106.1	Experiment with different types of materials to find the mechanical properties
A2106.2	Determine the Brinell and Rockwell hardness number to find the hardness of given specimen
A2106.3	Analyze elastic constants of spring and beam to design structural members
A2106.4	Determine toughness of materials using Charpy and Izod test
A2106.5	Prove Maxwell's reciprocal theorem for its validity on beams

Course name: **SURVEYING LAB** **A2107** Course year:2020-21

A2107.1	Make use of conventional surveying instruments in plotting of a layout
A2107.2	Determine horizontal and vertical angles by Theodolite for a given traverse
A2107.3	Compute the difference in elevations using various levelling Instruments
A2107.4	Utilize Rankine's and two Theodolite methods to plot curves
A2107.5	Experiment with total station to find fundamental measurements accurately in thefield

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Course name: **ENGINEERING GEOLOGY LAB A2108** Course year:2020-21

A2108.1	Identify various minerals and rocks by their origin and properties
A2108.2	Apply geological features influencing rock masses and discontinuities
A2108.3	Measure strike and dip of the bedding planes
A2108.4	Interpret geological maps to represent the distribution of rocks and minerals

Course name: **QUANTITATIVE APTITUDE AND REASONING – I A2017**
Course year:2020-21

A2017.1	Identify the problems by applying mathematical fundamentals
A2017 .2	Apply the suitable logical methods to solve the problems
A2017 .3	Solve the various problems by using quantitative mathematical fundamentals
A2017 .4	Analyze the comprehensive data with logical ability

Course name: **ENVIRONMENTEAL SCIENCE A2031** Course year:2020-21

A2031.1	Solve environmental problems through higher level of personal involvement and interest
A2031.2	Apply ecological morals to keep up amicable connection among nature and human beings
A2031.3	Recognize the interconnectedness of human dependence on the earth's ecosystems
A2031.4	Apply environmental laws for the protection of environment and wildlife
A2031.5	Influence society in proper utilization of goods and services

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CIVIL II-II

Course name: **MANAGERAIL ECONOMICS AND FINALCIAL ANAYSIS A2019**

Course year:2020-21

A2019.1	Analyze the concepts of managerial economics and financial accounting to make better decisions in the organization
A2019.2	Analyze the demand, production, cost and break even to know interrelationship among variables and their impact
A2019.3	Classify the market structure to decide the fixation of suitable price
A2019.4	Apply capital budgeting techniques to select best investment opportunity
A2019.5	Analyze and prepare financial statements to assess financial health of business

Course name: **HYDRAULICS AND HYDRAULIC MACHINERY A2109**

Course year:2020-21

A2109.1	Apply Chezy 's and Manning's equation to find geometric properties of channels
A2109.2	Analyze specific energy and flow conditions to find critical depth in various channels
A2109.3	Determine the characteristics of hydraulic jump in channels using momentum and specific energy equations
A2109.4	Evaluate force exerted by the jet of water on stationary and moving plates to understand the working principles of turbine
A2109.5	Assess the characteristics of hydraulic turbines and pumps to find the efficiency

Course name: **WATER RESOURCES ENGNEERING-I A2110** Course year:2020-21

A2110.1	Interpret rainfall data using different methods
A2110.2	Apply various methods to estimate surface and ground water hydrology components
A2110.3	Build the knowledge to connect hydrology with respect to field requirement
A2110.4	Design irrigation channels using silt theories
A2110.5	Classify various hydraulic structures involved in cross drainage works efficiency

Course name: **STRENGTH OF MATERAILS-II A2111** Course year:2020-21

A2111.1	Assess an inclined section to find principal stresses and strains using analytical and graphical methods
A2111.2	Design different types of shafts and springs subjected to torsion
A2111.3	Analyze failure of columns and struts for various end conditions by calculating the crushing load
A2111.4	Apply various theories of failure on the structural members for safe design
A2111.5	Design thin and thick cylinders subjected to fluid pressure

Course name: **STRUCTURAL ANALYSIS-I A2112** Course year:2020-21

A2112.1	Interpret various energy theorems to find deflections in beams
A2112.2	Analyze the statically indeterminate members for various loading conditions
A2112.3	Develop shear force and bending moment diagrams for fixed and continuous beams
A2112.4	Apply Clapeyron's three moment theorem to find end and intermediate moments
A2112.5	Analyze indeterminate beams with and without support settlements using slope eflection And moment distribution methods

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Course name: **HYDRAULICS AND HYDRAULIC MACHINERY LAB A2113**
Course year:2020-21

A2113.1	Calibrate flow measuring devices to check the rate of flow
A2113.2	Prove the validity of Bernoulli equation when applied to fluid flow patterns
A2113.3	Conduct experiments on flow measuring devices to find coefficient of discharge
A2113.4	Measure the impact forces produced by jet of water striking on flat and curved surfaces
A2113.5	Test basic performance parameters of hydraulic turbines and pumps

Course name: **COMPUTER AIDED DRAWING FOR LAB A2114** Course year:2020-21

A2114.1	Make use of different tools in AutoCAD to draw regular and irregular shapes
A2114.2	Modify existing drawings as per client requirements using necessary commands
A2114.3	Develop a plan, section and elevation of various structures to implement on site
A2114.4	Apply computer aided drawings to find sectional properties of structural components
A2114.5	Create 3D drawings from 2D plan of various buildings for architectural purposes

Course name: **QUANTITATIVE APTITUDE AND REASONING-II A2018**
Course year:2020-21

A2018.1	Identify the problems by applying mathematical fundamentals
A2018.2	Apply the suitable logical method to solve the problems
A2018.3	Solve the various problems by using quantitative mathematical fundamentals
A2018.4	Apply computer aided drawings to find sectional properties of structural components

Course name: **HUMAN VALUES AND POFESSIONAL ETHICS A2032**
Course year:2020-21

A2032.1	Apply human values and ethics in professional life
A2032.2	Develop the moral ideals to maintain good relationships with people
A2032.3	Solve environmental related problems by keeping health of human being into consideration.
A2032.4	Make use of the fundamental rights and human rights in life for individual dignity
A2032.5	Build the sound health system both physically and mentally by practicing yoga,karate, sports etc.

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ELECTRICAL AND ELECTRONICS ENGNEERING

B. TECH II-I

Course name: TRANSFORM TECHNIQUES AND COMPLEX VARIABLES A2015
Course year:2020-21

A2015.1	Apply Laplace transforms to solve ordinary differential equations
A2015.2	BuildFourierseriesandFouriertransformsofagivenfunction
A2015.3	Test for analyticity of complex functions in the given domain
A2015.4	Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours
A2015.5	Evaluate improper integrals of complex functions using Residue theorem

Course name: ELECTRICAL MACHINES-I A2207 Course year:2020-21

A2207.1	Apply the principles of AC and DC machines to identify a suitable electrical machine for a given application
A2207.2	Deduce the emf / Voltage equations of DC Machines and single-phase transformers
A2207.3	Analyze the various characteristics of DC Machines, single phase and three phase transformers
A2207.4	Test the performance of DC Machines and Single phase transformers
A2207.5	Apply suitable test to control the speed of DC motor

Course name: ELECTRO MAGNETIC FIELDS A2208 Course year:2020-21

A2208.1	Apply orthogonal coordinate systems for Electric and magnetic fields over the distribution of charge
A2208.2	Analyse the charge configurations of Electric and Magnetic fields using Coulombs law, Gauss's law, Biot-Savart's Law, Ampere's circuital Law and Poynting theorem
A2208.3	Evaluate the capacitance, Inductance and Magnetic forces for various conductors in Electromagnetic fields
A2208.4	Investigate the behaviour of Electric and Magnetic Fields in Static and Time Varying Fields by Maxwell'sequations
A2208.5	Analyse the plane wave equation in free space, dielectrics and conductors

Course name: ELECTRICAL CIRCUITS-II A2209 Course year:2020-21

A2209.1	Analyze three phase circuits to determine line voltages, line currents, phase voltages and phase currents
A2209.2	Apply differential equation and Laplace transform techniques for transient response of series and parallel RLC circuits
A2209.3	Designalowpassfilter,highpassfilter,bandpassfilterandattenuatorsforgivencircuit parameters
A2209.4	Develop a dual circuit, cutest and tie set matrices for a given circuit

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Course name: ELECTRONIC CIRCUITS-I A2408 Course year:2020-21

A2408.1	Analyze the operation and characteristics of diodes and transistors
A2408.2	Analyze various applications of diodes and transistors
A2408.3	Make use of Boolean algebra postulates to minimize Boolean functions
A2408.4	Construct and analyze various combinational and sequential circuits used in digital systems

Course name: ELECTRICAL MACHINES-I LABORATORY A2210 Course year:2020-21

A2210.1	Determine the critical field resistance and critical speed of a DC Shunt generator
A2210.2	Plot the characteristics of DC shunt, Series and Compound generators using load test
A2210.3	Test the performance of a given DC motor using suitable technique
A2210.4	Apply suitable test to calculate the losses for a given DC machine

Course name: ELECTRICAL CIRCUITS AND SIMULATION LABORATORY A2211 Course year:2020-21

A2211.1	Analyze RL and RC series circuits, 3 phase balanced and unbalanced system and power system network using PSPICE programming
A2211.2	Test the transient response of DC & AC series RLC circuits using PSPICE programming
A2211.3	Design the dual network, low pass and high pass filter using PSPICE programming.
A2211.4	Simulate a given DC circuit using PSPICE programming

Course name: ELECTRIONIC CIRCUITS-I LABORATORY A2409 Course year:2020-21

A2409.1	Analyze the description of CRO and Function generator panels
A2409.2	Determine cut-in, break-down voltages, static and dynamic resistances from V-I characteristics ofelectronic devices
A2409.3	Measure the ripple content present in rectifiers using with and without filters
A2409.4	Make use of small signal analysis to plot the characteristics of BJT and FET
A2409.5	Make use of Lab VIEW software to construct combinational and sequential circuits
A2409.6	Test and Debug the combinational and sequential circuits using LabVIEW Software

Course name: QUANTITATIVE APTITUDE AND REASONING-I A2017 Course year:2020-21

A2017.1	Identify the problems by applying mathematical fundamentals
A2017.2	Apply the suitable logical methods to solve the problems
A2017.3	Solve the various problems by using quantitative mathematical fundamentals
A2017.4	Analyse the comprehensive data with logical ability

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Course name: HUMAN VALUES AND PROFESSIONAL ETHICS A2032
Course year:2020-21

A2032.1	Apply human values and ethics in professional life
A2032.2	Develop the moral ideals to maintain good relationships with people
A2032.3	Solve environmental related problems by keeping health of human being into consideration
A2032.4	Make use of the fundamental rights and human rights in life for individual dignity
A2032.5	Build the sound health system both physically and mentally by practicing yoga, karate, sports etc.

B. TECH II-II

Course name: MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
A2019 COURSE YEAR:2020-2021

A2019.1	Analyze the concepts of managerial economics and financial accountingto make betterdecisions in the organization
A2019.2	Analyze the demand, production, cost and break even to know interrelationship amongvariables and their impact
A2019.3	Classify the market structure to decide the fixation of suitable price
A2019.4	Apply capital budgeting techniques to select best investment opportunity
A2019.5	Analyze and prepare financial statements to assess financial health of business

Course name: ELECTRICAL MACHINES-II A2212 COURSE YEAR:2020-2021

A2212.1	Apply the principles of AC machines to identify a suitable electrical machine for agiven application
A2212.2	Deduce the power and torque equations of Induction motors and synchronousmachines
A2212.3	Analyze the various characteristics of induction motors and synchronous machines
A2212.4	Test the performance of induction motors and synchronous machines
A2212.5	Apply a suitable test to control speed of Induction motors

Course name: CONTROL SYSTEMS A2213 COURSE YEAR:2020-2021

A2213.1	Determine the transfer function of a given system using different techniques
A2213.2	Analyze the response of a given system in time and frequency domains
A2213.3	Test the stability,observability and controllability of a given system
A2213.4	Apply suitable technique for calculating the gain margin and phase margin of a givensystem

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Course name: ELECTRICAL POWER GENERATION A2214
COURSE YEAR:2020-2021

A2214.1	Apply the knowledge of conversion of energy for different energy sources to generateelectrical power
A2214.2	Draw the layouts of different electrical power generating systems
A2214.3	Select the optimal location for the establishment of different electrical power plants
A2214.4	Analyze the base load and peak load conditions to select suitable generating stations
A2214.5	Compare different types of tariffs suitable for different loads

Course name: ELECTRONIC CIRCUITS-II A2419 COURSE YEAR:2020-2021

A2419.1	Analyze the characteristics and applications of operational amplifier
A2419.2	Construct different active filters and oscillator circuits using op-amp and make use of IC555 and PLL effectively in communication systems
A2419.3	Analyze the concepts of combinational and sequential logic circuits and use them in thedesign of latches, counters using digital IC's
A2419.4	Distinguish between different signals and systems
A2419.5	Analyze different signals by using an appropriate transform

Course name: CONTROL SYSTEMS LABORATORY A2215
COURSE YEAR:2020-2021

A2215.1	Plot the characteristics of AC servo motor, DC servo motor, synchros and magneticamplifier
A2215.2	Determine the transfer function of DC machine and time domain specifications ofsecond order system
A2215.3	Analyze the different logic gates using Programmable Logic Controller
A2215.4	Analyze the stability of given system in time domain and frequency domain usingMATLAB software
A2215.5	Test the effect of P, PD, PI, PID controller on a second order system

Course name: ELECTRICAL MACHINES-II LABORATORY A2216
COURSE YEAR:2020-202

A2215.1	Test the performance of 1 phase Transformer, 3 phase induction motor andsynchronous motor by conducting suitable test
A2215.2	Determine circuit parameters of a 1 phase Transformer, 3 phase induction motor andsynchronous motor by conducting suitable test
A2215.3	Apply Scott connection for the conversion of a 3 phase to 2 phase systems
A2215.4	Determine the regulation of a 3 phase alternator and 1 phase transformer byconducting suitable test
A2215.5	Test the parallel operation and polarity test of a single phase transformer

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Course name: ELECTRONIC CIRCUITS-II LABORATORY A2420
COURSE YEAR:2020-2021

A2420.1	Implement different configurations of operational amplifiers
A2420.2	Construct and analyze various active filters using op-amp
A2420.3	Design and draw the internal structure of various logic gates
A2420.4	Analyze the generation ofoperations of various signals and sequences using MATLAB

Course name: QUANTITATIVE APTITUDE AND REASONING – II A2018
COURSE YEAR:2020-2021

A2018.1	Identify the problems by applying mathematical fundamentals
A2018.2	Apply the suitable logical method to solve the problems.
A2018.3	Solve the various problems by using quantitative mathematical fundamentals.
A2018.4	Analyse the comprehensive data with logical ability

Course name: ENIVRONMENTAL SCIENCE A2031 COURSE YEAR:2020-2021

A2031.1	Solve environmental problems through higher level of personal involvement and interest
A2031.2	Apply ecological morals to keep up amicable connection among nature and human beings
A2031.3	Recognize the interconnectedness of human dependence on the earth's ecosystems
A2031.4	Apply environmental laws for the protection of environment and wildlife
A2031.5	Influence society in proper utilization of goods and services

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COURSE OUTCOMES

MECH II-I

Course name: **TRANSFORM TECHNIQUES AND NUMERICAL METHODS**

A2014 Course year:2020-21

A2014.1	Apply Laplace transforms to solve ordinary differential equations
A2014.2	Build Fourier series and Fourier transforms of a given function
A2014.3	Apply numerical methods to solve algebraic and transcendental equations
A2014.4	Derive interpolating polynomials using interpolation formulae
A2014.5	Solve differential and integral equations numerically

Course name: **THERMODYNAMICS** **A2305** Course year:2020-21

A2305.1	Apply the concepts of thermodynamics in the form of Work and Heat to various engines
A2305.2	Make use of energy equations for steady flow of fluids
A2305.3	Apply the thermodynamic laws to various applications
A2305.4	Determine the efficiency of the cycles for various applications
A2305.5	Analyze basic laws of ideal gas, power cycles and refrigeration cycles for various applications

Course name: **MECHANICS OF SOLIDS** **A2306** Course year:2020-21

A2306.1	Analyze the types of stresses, strains and elastic constants of mechanical components
A2306.2	Construct shear force and bending moment diagrams for beams subjected to various loads
A2306.3	Formulate the bending and shear stress equations and shear stress distribution for beams and shafts
A2306.4	Solve problems related to slope and deflection equations for beams subjected to various loads
A2306.5	Estimate hoop and longitudinal stresses in thin and thick cylinders

Course name: **MATERIAL SCIENCE AND ENGINEERING** **A2307**

Course year:2020-21

A2307.1	Identify the properties of the crystallization of ferrous and nonferrous materials
A2307.2	Construct the equilibrium diagrams by experimental methods
A2307.3	Make use of advanced composite materials in manufacturing of components and sophisticated machine
A2307.4	Improve the properties of ferrous and nonferrous materials using different heat treatment processes
A2307.5	Select the suitable materials for various engineering applications

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Course name: **ENGINEERING DRAWING FOR MECHANICAL ENGINEERS A2308** Course year:2020-21

A2308.1	Apply orthographic projection concepts to draw projections of right regular solids
A2308.2	Make use of sectional planes to draw sectional views of a solid
A2308.3	Apply isometric projection concepts to draw isometric projections of right regular solidsand sectioned solids
A2308.4	Construct Intersection curves when one right regular solid penetrates another right regular solid
A2308.5	Make use of perspective projection concepts to draw simple planes and right regular solids

Course name: **MECHANICS OF SOLIDS LAB A2309** Course year:2020-21

A2309.1	Analyze the stress-strain diagram for different materials using universal testing machine
A2309.2	Compare the hardness values for various materials using hardness testing machine
A2309.3	Determine modulus of elasticity, bending stresses and deflection for different beams
A2309.4	Estimate the stiffness and shear modulus of springs using tension test
A2309.5	Asses the toughness and impact strength using impact testing machine

Course name: **MATERIAL SCIENCE AND ENGINEERING LAB A2310** Course year:2020-21

A2310.1	Make use of different material samples for investigating micro structures
A2310.2	Interpret the microstructures of materials using metallurgical microscope
A2310.3	Measure the hardenability of mild steel samples
A2310.4	Improve the properties of materials using various heat treatment processes
A2310.5	Compare the properties of different materials with temperature variation

Course name: **COMPUTER AIDED DRAFTING LAB A2311** Course year:2020-21

A2311.1	Identify the commands in AutoCAD software to draw required objects
A2311.2	Create the mechanical components in 2 – Dimensional using AutoCAD commands
A2311.3	Draw the projections of solids using AutoCAD commands
A2311.4	Draw the sectional views of solids using AutoCAD commands
A2311.5	Draw the orthographic views of solids from isometric views using AutoCAD commands

Course name: **QUANTITATIVE APTITUDE AND REASONING-I A2015** Course year:2020-21

A2015.1	Identify the problems by applying mathematical fundamentals
A2015.2	Apply the suitable logical methods to solve the problems
A2015.3	Solve the various problems by using quantitative mathematical fundamentals
A2015.4	Analyse the comprehensive data with logical ability

Course name: **ENVIRONMENTAL SCIENCE A2031** Course year:2020-21

A2031.1	Solve environmental problems through higher level of personal involvement and interest
A2031.2	Apply ecological morals to keep up amicable connection among nature and human beings
A2031.3	Recognize the interconnectedness of human dependence on the earth's ecosystems
A2031.4	Apply environmental laws for the protection of environment and wildlife
A2031.5	Influence society in proper utilization of goods and services

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MECH II-II

Course name: **FLUID MECHANICS & HYDRAULIC MACHINES A2312**

Course year:2020-21

A2312.1	Analyze properties of fluids under different conditions
A2312.2	Identify the fluid flow patterns using different equations
A2312.3	Determine fluid flow using devices and principles of fluid mechanics
A2312.4	Apply boundary layer concepts to various types of flow and forces exerted by jet on vanes
A2312.5	Estimate the performance of hydraulic turbines and pumps for various design considerations

Course name: **KINEMATICS OF MACHINERY A2313** Course year:2020-21

A2313.1	Differentiate mechanism, machine and structure with respect to kinematic motions
A2313.2	Analyse the mechanism of straight-line motion, steering and Hooke's joint as per suitable applications
A2313.3	Draw velocity and acceleration diagrams by using relative velocity method and instantaneous center method
A2313.4	Solve the problems related to gears and gear trains using suitable methods
A2313.5	Analyze cam profile design with specified contours

Course name: **I.C. ENGINES A2314** Course year:2020-21

A2314.1	Identify constructional features and working principles of the S.I and C.I engines
A2314.2	Analyze the stages of combustion in S.I and C.I engines for better performance
A2314.3	Apply various performance methods to increase the engine efficiency
A2314.4	Identify constructional features and working principles of air compressors
A2314.5	select suitable automobile systems for internal combustion engine

Course name: **MANUFACTURING TECHNOLOGY A2315** Course year:2020-21

A2315.1	Select suitable material for preparing the patterns
A2315.2	Make use of moulding systems to prepare a product
A2315.3	Recommend the melting and solidification processes for designing the gatingsystem
A2315.4	Identify the suitable special casting and welding processes used for the given application
A2315.5	Identify the process parameters and defects to get quality product

Course name: **COMPUTER AIDED MACHINE DRAWING A2316**

Course year:2020-21

A2316.1	Construct different materials used in engineering practice through conventional representation
A2316.2	Develop skills related to the dimensioning, sectioning and development of views
A2316.3	Apply suitable techniques to draw various parts of assembly drawing
A2316.4	Make use of the orthographic and isometric projections to draw machine elements
A2316.5	Plan the part or assembly drawings as per the conventions

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Course name: **FLUID MECHANICS & HYDRAULIC MACHINES LAB A2317**
Course year:2020-21

A2317.1	Analyze procedure for performance of various experiments
A2317.2	Calibrate flow discharge measuring devices used in pipes, channels and tanks
A2317.3	Analyze the fluid flow through pipes with different materials and sizes
A2317.4	Determine coefficient of discharge of fluid flow through pipes
A2317.5	Evaluate the performance analysis of various pumps and turbines

Course name: **I.C. ENGINES LAB A2318** Course year:2020-21

A2318.1	Construct valve and port timing diagram of SI engine and CI engine
A2318.2	Analyze the influence of variations in TDC and BDC operations of I.C engine
A2318.3	Calculate the power and efficiencies of I.C engines
A2318.4	Test the performance of IC engine at various loads and Air fuel ratio
A2318.5	Calculate the efficiency of reciprocating air compressor

Course name: **MANUFACTURING TECHNOLOGY LAB A2319**
Course year:2020-21

A2319.1	Identify various casting and welding equipment used in manufacturing processes
A2319.2	Choose suitable Sand properties of green sand to get quality specimen
A2319.3	Determine the sequence of process to complete a job
A2319.4	Make use of various welding, foundry and forming equipment to prepare the job
A2319.5	Apply pattern making procedure for casting process

Course name: **QUANTITATIVE APTITUDE AND REASONING-II A2016**
Course year:2020-21

A2016.1	Identify the problems by applying mathematical fundamentals
A2016.2	Apply the suitable logical method to solve the problems
A2016.3	Solve the various problems by using quantitative mathematical fundamentals
A2016.4	Analyse the comprehensive data with logical ability

Course name: **HUMAN VALUES AND PROFESSIONAL ETHICS A2047**
Course year:2020-21

A2047.1	Apply human values and ethics in professional life
A2047.2	Develop the moral ideals to maintain good relationships with people
A2047.3	Solve environmental related problems by keeping health of human being into consideration
A2047.4	Make use of the fundamental rights and human rights in life for individual dignity
A2047.5	Build the sound health system both physically and mentally by practicing yoga, karate, sports etc.

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COURSE OUTCOMES

ECE II-I

Course name: **TRANSFORM TECHNIQUES AND COMPLEX VARIABLES A2015**
Course year:2020-21

A2015.1	Apply Laplace transforms to solve ordinary differential equations.
A2015.2	Build Fourier series and Fourier transforms of a given function.
A2015.3	Test for analyticity of complex functions in the given domain.
A2015.4	Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.
A2015.5	Evaluate improper integrals of complex functions using Residue theorem.

Course name: **ELECTRONIC DEVICES AND CIRCUITS A2401** Course year:2020-21

A2401.1	Explain the construction, working principles and applications of various electronic devices.
A2401.2	Analyze the characteristics of diodes and transistors.
A2401.3	Design the DC bias circuitry of BJT and FET for various applications
A2401.4	Construct the simple amplifier circuits using BJT and FET.

Course name: **DIGITAL LOGIC DESIGN A2402** Course year:2020-21

A2402.1	Apply arithmetic operations and principles of Boolean algebra to minimize logic expressions.
A2402.2	Make use of K-map and tabulation methods to minimize Boolean functions.
A2402.3	Analyze the performance of different combinational and sequential circuits.
A2402.4	Design various programmable logic devices using combinational circuits

Course name: **SIGNALS AND SYSTEMS A2403** Course year:2020-21

A2403.1	Distinguish between different signals and systems.
A2403.2	Make use of Fourier series for the representation of signals
A2403.3	Analyze different signals by using an appropriate transform.
A2403.4	Examine the transmission characteristics of linear systems
A2403.5	Select an appropriate transform to find the transfer function of linear systems.

Course name: **PROBABILITY THEORY AND STOCHASTICS PROCESSES A2404**
Course year:2020-21

A2404.1	Apply different probability techniques to observe the different events.
A2404.2	Determine the characteristics of random variables and random processes.
A2404.3	Classify the random processes by using different techniques.
A2404.4	Analyze the temporal and spectral characteristics of stochastic processes.
A2404.5	Develop the relationship between the input and output statistical characteristic of a linear system.

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Course name: **ELECTRONIC DEVICES AND CIRCUITS LAB A2405** Course year:2020-21

A2402.1	Identify various electronic components and measuring equipment.
A2402.2	Analyze the V-I characteristics of electronic devices.
A2402.3	Measure the ripple content present in rectifiers with and without filters.
A2402.4	Construct single stage amplifier circuits and plot transient and frequency response.

Course name: **DIGITAL LOGIC DESIGN LABAROTRY A2406** Course year:2020-21

A2406.1	Make use of LabVIEW software to construct combinational and sequential circuits
A2406.2	Test and De bug the combinational and sequential circuits using LabVIEW Software.
A2406.3	Analyze virtual lab demo for Boolean relations using digital comparators.
A2406.4	Develop LabVIEW based projects using LabVIEW Software.

Course name: **BASIC SIMULATION LABORATORY A2407** Course year:2020-21

A2407.1	Develop programs to generate different signals.
A2407.2	Compile programs to perform different operations on signals and sequences.
A2407.3	Analyze different responses of the systems and spectrums of the signals.
A2407.4	Test the different properties of given signals and systems
A2407.5	Estimate the mean skew, kurtosis, and probability distribution function of Gaussian noise.

Course name: **QUATITATIVE APTITUTUDE AND REASONING-I A2017** Course year:2020-21

A2017.1	Identify the problems by applying mathematical fundamentals.
A2017.2	Apply the suitable logical methods to solve the problems.
A2017.3	Solve the various problems by using quantitative mathematical fundamentals.
A2017.4	Analyze the comprehensive data with logical ability.

Course name: **HUMAN VALUES PROFESSIONAL ETHICS A2032** Course year:2020-21

A2032.1	Apply human values and ethics in professional life.
A2032.2	Develop the moral ideals to maintain good relationships with people.
A2032.3	Solve environmental related problems by keeping health of human being into consideration.
A2302.4	Make use of the fundamental rights and human rights in life for individual dignity
A2032.5	Build the sound health system both physically and mentally by practicing yoga, karate, sports etc.

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ECE II-II

Course name: **CONTROL SYSTEMS** **A2213** Course year:2020-21

A2213.1	Determine the transfer function of a given system using different techniques.
A2213.2	Analyze the response of a given system in time and frequency domains
A2213.3	Test the stability, observability and controllability of a given system.
A2213.4	Apply suitable technique for calculating the gain margin and phase margin of a given system.

Course name: **ELECTROMAGNETIC AND TRANSMISSION LINES A2410**

Course year:2020-21

A30004.1	Apply various laws of electrostatics and magnetostatics to deduce Maxwell's equations in static and time variants fields.
A30004.2	Develop boundary conditions for different combinations of media.
A30004.3	Make use of Maxwell's equations to deduce EM wave equations.
A30004.4	Develop expressions for primary and secondary parameters of transmission line using conventional and graphical methods.
A30004.5	Derive continuity equation, Poisson's, Laplace's equation and Poynting theorem to characterize field.

Course name: **ELECTRONIC CIRCUIT ANALYSIS** **A2411** Course year:2020-21

A2411.1	Analyze the small signal models of BJT amplifiers at high frequencies.
A2411.2	Analyze the frequency response of single and multi-stage amplifiers with compound connections.
A2411.3	Classify amplifiers based on feedback mechanism.
A2411.4	Evaluate the efficiency of large signal amplifiers.
A2411.5	Explain the concept of resonant frequency in tuned amplifiers.

Course name: **ANALOG COMMUNICATION SYSTEM** **A2412** Course year2020-21

A30001.1	Explain the operation of different analog communication systems.
A30001.2	Analyze the performance of different modulation schemes used in analog communication systems.
A30001.3	Make use of sampling theorem to generate pulse modulation signals.
A30001.4	Analyze the performance of AM, FM and PM receivers in the presence of noise.
A30001.5	Choose an appropriate modulation technique to design an analog communication system.

Course name: **INTERNET OF THINGS** **A2413** Course year:2020-21

A2413.1	Analyze IoT applications using IoT design principles, protocols and levels.
A2413.2	Distinguish sensors and actuators in terms of their functions and applications.
A2413.3	Interface I/O devices, Sensors using Arduino uno.
A2413.4	Apply Python concepts for programming of Raspberry Pi.
A2413.5	Develop IoT applications using Raspberry Pi and Arduino uno.

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Course name: **ELECTRONIC CIRCUIT ANALYSIS LAB A2414** Course year:2020-21

A2414.1	Design single and multistage amplifiers at low, mid and high frequencies.
A2414.2	Determine the gain of feedback amplifiers and efficiency of power amplifiers.
A2414.3	Design oscillator circuits for given frequency of oscillation
A2414.4	Compare the frequency response of tuned amplifiers.
A2414.5	Analyze all the electronic circuits using simulation software and hardware.

Course name: **ANALOG COMMUNICATION SYSTEMS LAB A2415**
Course year:2020-21

A2415.1	Operate optical instruments like Travelling microscope and spectrometer
A2415.2	Understand the concepts of interference by finding thickness of paper, radius of curvature of Newton's rings
A2415.3	Interpret the concept of diffraction by the determination of wavelength of different colors of white light and dispersive power of grating
A2415.4	Plot the intensity of the magnetic field of circular coil carrying current with varying distance and B-H curve

Course name: **INTERNET OF THINGS LABORATORY A2416** Course year:2020-21

A2416.1	Develop embedded C Programs using Arduino UNO and IDE.
A2416.2	Execute Arduino C programs for blink LED, push button, potentiometer, fade LED, LDR, serial interface, LCD, DHT sensor.
A2416.3	Build Programs of Raspberry-Pi using python
A2416.4	Interface LEDs, Push Buttons, Potentiometer to Raspberry-Pi.
A2416.5	Test and Debug Arduino UNO embedded C and Raspberry-Pi python Programs.

Course name: **QANTITATIVE APTITUDE AND REASONING A2018** Course year:2020-21

A2018.1	Identify the problems by applying mathematical fundamentals.
A2018.2	Apply the suitable logical method to solve the problems.
A2018.3	Solve the various problems by using quantitative mathematical fundamentals.
A2018.4	Analyze the comprehensive data with logical ability.

Course name: **ENVIRONMENTAL SCIENCE A2031** Course year:2020-21

A2031.1	Solve environmental problems through higher level of personal involvement and interest.
A2031.2	Apply ecological morals to keep up amicable connection among nature and human beings.
A2031.3	Recognize the interconnectedness of human dependence on the earth's ecosystems.
A2031.4	Apply environmental laws for the protection of environment and wildlife
A2031.5	Influence society in proper utilization of goods and services.

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COURESE OUTCOMES

CSE II-I

Course name: **MANAGERIAL ECONOMICS &FINANCIAL ANALYSIS A2701** Course year:2020-21

A2701.1	Apply the knowledge of managerial economics and financial accounting to solve business problems.
A1518.2	Analyze the demand, production cost and break even with suitable methods.
A1518.3	Classify the market structure to decide the fixation of suitable price.
A1518.4	Apply capital budgeting techniques to select best investment opportunity.
A1518.5	Prepare financial statements to assess financial health of business.

Course name: **OBJECT ORIENTED PROGRAMMING THROUGH JAVA A2505** Course year:2020-21

A2505.1	Apply object-oriented concepts for solving general purpose problems
A2505.2	Use inheritance, user defined packages and interfaces for code reusability
A2505.3	Apply exception handling and multithreading concepts for robust and efficient application Development
A2505.4	Implement collection frameworks to store and retrieve data efficiently
A2505.5	Build GUI applications using swings for user interface design

Course name: **DATABASE MANAGEMENT SYSTEMS A2506** Course year:2020-21

A2506.1	Apply suitable data model for given application
A2506.2	Construct optimized SQL queries to solve real time problems
A2506.3	Apply suitable normal form to eliminate data redundancy
A2506.4	Use suitable transaction model to avoid Deadlock
A2506.5	Choose appropriate index structure to improve performance

Course name: **SOFTWARE ENGINEERING A2507** Course year:2020-21

A2507.1	Identify the phases of software development life cycle for better design
A2507.2	Apply different agile principles in developing a project
A2507.3	Adapt appropriate requirement engineering process for change management
A2507.4	Propose design as per functional and non-functional requirements using design principles
A2507.5	Implement various testing techniques for software systems

Course name: **DISCRETE MATHEMATICS A2508** Course year:2020-21

A2508.1	Apply the logic statements and connectives to solve real time problems
A2508.2	Classify algebraic structure and relations for a given mathematical problem
A2508.3	Analyze the basic results in combinatorics and binomial thermos for accuracy
A2508.4	Apply various recurrence relations to find solutions for numeric sequences
A2508.5	Apply graph theory techniques to solve network problems

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Course name: **OBJECT ORIENTED PROGRAMMING USING JAVA LAB** **A2509** Course year:2020-21

A2509.1	Design solutions for the problems of general-purpose applications using object-oriented concepts.
A2509.2	Generate reusable code using inheritance, user defined packages and interface
A2509.3	Write robust and efficient code using exception handling and multithreading concepts
A2509.4	Implement collection frameworks and file handling techniques to store and retrieve data
A2509.5	Design user interface using swings

Course name: **DATABASE MANAGEMENT LABORATORY** **A2510** Course year:2020-21

A2510.1	Design Database tables for the given problem
A2510.2	Use appropriate querying processing technique to access the data
A2510.3	Apply suitable normal form to eliminate data redundancy
A2510.4	Develop PL/SQL routines for reusability of code
A2510.5	Apply appropriate triggering concepts for automation and performance

Course name: **IOT AND ROBOTICS LABORATORY** **A2511** Course year:2020-21

A2511.1	Apply concepts of Internet to Mobile Devices, Cloud and Sensor Networks
A2511.2	Analyze building blocks of Internet of Things and characteristics
A2511.3	Implement a robot for a specific application
A2511.4	Compare various Servo and hardware components with Controller based projects
A2511.5	Develop small pervasive applications with the help of Robotics

Course name: **QUANTITATIVE APTITUDE AND REASONING-I** **A2015** Course year:2020-21

A2015.1	Identify the problems by applying mathematical fundamentals
A2015.2	Apply the suitable logical methods to solve the problems
A2015.3	Solve the various problems by using quantitative mathematical fundamentals
A2015.4	Analyse the comprehensive data with logical ability

Course name: **ENVIRONMENTAL SCIENCE** **A2031** Course year:2020-21

A2031.1	Solve environmental problems through higher level of personal involvement and interest.
A2031.2	Apply ecological morals to keep up amicable connection among nature and human beings.
A2031.3	Recognize the interconnectedness of human dependence on the earth's ecosystems
A2031.4	Apply environmental laws for the protection of environment and wildlife.
A2031.5	Influence society in proper utilization of goods and services.

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CSE II-II

Course name: **FORMAL LANGUAGE AUTOMATA THEORY A2541** Course year:2020-21

A2541.1	Apply knowledge of computing and mathematics appropriate to the discipline.
A2541.2	Apply and solve Regular Expressions in Real Time Applications
A2541.3	Relate the concept of the grammar with the concept of programming language.
A2541.4	Design solutions for the problems related to Finite Automata, RE, CFG, PDA and Turing Machine.
A2541.5	Acquire a fundamental understanding of core concepts relating to the theory of com- putation and computational models including decidability and intractability.

Course name: **WEB TECHNOLOGYIES A2512** Course year:2020-21

A2512.1	Construct a basic website using HTML and Cascading Style Sheets.
A2512.2	Build dynamic web page using Java Script objects and event handling mechanisms.
A2512.3	Develop server side programs using Servlets and Java Server Page
A2512.4	Develop server side programs using Servlets and Java Server Page
A2512.5	Use AJAX and web services to develop interactive web applications

Course name: **DESIGN AND ANALYSIS OF ALGORITHMS A2513** Course year:2020-21

A2513.1	Analyze the efficiency of algorithm for a given problem.
A2513.2	Formulate the time order analysis for given algorithm
A2513.3	Identify the mathematical techniques required to prove the time complexity of an algorithm.
A2513.4	Identify the mathematical techniques required to prove the time complexity of an algorithm.

Course name: **OPERATING SYSTEMS A2514** Course year :2020-21

A1527.1	Apply the basic principles of Operating Systems in system programming
A1527.2	Apply the process synchronization concepts in multiprogramming environment
A1527.3	Solve the memory management problems with paging and segmentation techniques
A1527.4	Design algorithmic strategies to handle deadlock problems
A1527.5	Implement the concepts of secured file system for confidentiality and authentication.

Course name: **COMPUTER NETWORKS A2515** Course year:2020-21

A2515.1	Apply the networking concepts in configuring the systems
A2515.2	Illustrates error handling mechanism in data link layer
A2515.3	Analyze the routing algorithms in finding the shortest path
A2515.4	Apply transport protocols in network communications
A2515.5	Implements domain name service and network security in the communication segment.

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Course name: **WEB TECHNOLOGYIES LABORATORY A2516** Course year:2020-21

A2516.1	Construct Web pages using HTML/XML and style sheets
A2516.2	Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.
A2516.3	Develop dynamic web pages using server-side scripting
A2516.4	Use PHP programming to develop web applications
A2512.5	Construct web applications using AJAX and web services

Course name: **ALGORITHMS AND NETWORK LABORATORY A2517** course year:2020-21

A2517.1	Apply basic programming techniques in solving given problem
A2517.2	Design an algorithm for a given application program.
A2517.3	Utilize wrapper classes as per the demand of problem.
A2517.4	Apply the appropriate algorithmic technique for efficient problem solving.
A2517.5	Execute collection classes for dynamic programming

Course name: **OPERATING SYSTEMS LABORATORY A2514** Course 2020-21

A2514.1	Apply appropriate CPU scheduling algorithm for the given problem.
A2514.2	Perform resource management for optimal utility of CPU
A2514.3	Implement algorithms handling deadlock problems
A2514.4	Implement the concepts of secured file system for confidentiality and authentication.
A2514.5	Apply threading concepts to handle concurrency.

Course name: **QUANTITATIVE APTITUDE AND REASONING-II A2016** Course year:2020-21

A2016.1	Identify the problems by applying mathematical fundamentals
A2016.2	Apply the suitable logical methods to solve the problems
A2016.3	Solve the various problems by using quantitative mathematical fundamentals
A2016.4	Analyze the comprehensive data with logical ability

Course name: **HUMAN VALUS AND PROFESSIONAL ETHICS A2047** Course year:2020-21

A2047.1	Apply human values and ethics in professional life
A2047.2	Develop the moral ideals to maintain good relationships with people
A20476.3	Solve environmental related problems by keeping health of human being into consideration
A2047.4	Make use of the fundamental rights and human rights in life for individual dignity
A2047.5	Build the sound health system both physically and mentally by practicing yoga, karate, sports etc.

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COURSE OUTCOMES

CIVIL III-I

Course name: WATER RESOURCES ENGINEERING-I A21116

Course year:2020-21

A21116.1	Interprete rainfall data using different methods
A21116.2	Apply various methods to estimate surface and ground water hydrology components
A21116.3	Build the knowledge to connect hydrology with respect to field requirement
A21116.4	Design irrigation channels using silt theories
A21116.5	Derive interpolating polynomials using interpolation formulae

Course name: DESIGN OF REINFORCED CONCREATE STRUCTURES A21117

Course year:2020-21

A21117.1	Make use of Indian Standard code provisions in designing reinforced concrete structures
A21117.2	Apply limit state design for serviceability, deflection and cracking
A21117.3	Justify the various modes of failure in reinforced concrete members
A21117.4	Design various reinforced concrete members to meet different loading conditions
A21117.5	Develop the reinforcement detailing drawings of concrete members to implement on site

Course name: STRUCTURAL ANALYSIS-II A21118

Course year:2020-21

A21118.1	Interpret structural actions in statically determinate and indeterminate structures
A21118.2	Analyze three hinged arches, continuous beams and portal frames using displacement method of analysis
A21118.3	Apply flexibility and stiffness method of analysis for two span continuous beams subjected to sinking of supports
A21118.4	Determine support reactions, shear forces and bending moments in beams andframes subjected to vertical and lateral loads
A21118.5	Assess the collapse mechanism and energy absorption capacity of fixed and continuous beams

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Course name: GEOTECHNICAL ENGINEERING-I A1119

Course year:2020-21

A21119.1	Evaluate the index and engineering properties of the soil
A21119.2	Determine the stress distributions in the founded soil
A21119.3	Analyze the compressibility of soils to obtain the coefficients
A21119.4	Determine support reactions, shear forces and bending moments in beams andframes subjected to vertical and lateral loads
A21119.5	Assess the shear strength of the soils under different drainage conditions

Course name: ENGINEERING GEOTECHNICAL LABORATORY A1120

Course year:2020-21

A21120.1	Identify various minerals and rocks by their origin and properties
A21120.2	Apply geological features influencing rock masses and discontinuities
A21120.3	Measure strike and dip of the bedding planes
A21120.4	Interpret geological maps to represent the distribution of rocks and minerals

Course name: GEOTECHNICAL ENGINEERING LABORATORY A1121

Course year:2020-21

A21121.1	Determine the index properties of the soil
A21121.2	Evaluate the engineering properties of the soil
A21121.3	Assess the sub grade strength of roads and pavements
A21121.4	Measure the co efficient of permeability for cohesive and non-cohesive soils
A21121.5	Estimate the shear strength under controlled drainage conditions

Course name: COMPUTER AIDED DESIGN LABORATORY-I A1122

Course year:2020-21

A21122.1	Evaluate beams with different loading conditions
A21122.2	Analyze trusses and portal frames
A21122.3	Develop building component models
A21122.4	Design footings for residential and commercial structures
A21122.5	Analyze and design cantilever retaining wall

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Course name: HUMAN VALUES AND PROFESSIONAL ETHICS A1015

Course year:2020-21

A1015.1	Apply human values and ethics in professional life
A1015.2	Develop the moral ideals to maintain good relationships with people
A1015.3	Solve environmental related problems by keeping health of human being into consideration
A1015.4	Make use of the fundamental rights and human rights in life for individual dignity
A1015.5	Build the sound health system both physically and mentally by practicing yoga,karate, sports etc

B Tech III-II

Course name: GEOTECHNICAL ENGINEERING-II A1123

Course year:2020-21

A1123.1	Determine the depth of foundation for various soil conditions
A1123.2	Assess the failure of slopes under different conditions
A1123.3	Evaluate the earth pressures acting on retaining walls
A1123.5	Calculate the bearing capacity of soils and foundation settlements
A1123.6	Estimate load carrying capacity of pile and pile group

Course name: GEOTECHNICAL ENGINEERING-II A1124

Course year:2020-21

A1124.1	Evaluate the properties and the quality of the concrete materials
A1124.2	Measure the fresh and hardened properties of concrete
A1124.3	Classify various special concretes based on their performance
A1124.4	Assess the effects of physical properties of concrete
A1124.5	Design concrete mixes for various field applications

Course name: TRANSPORTATION ENGINEERING-I A1125

Course year:2020-21

A1125.1	Develop a strong analytical and practical knowledge of highway planning
A1125.2	Apply theories of transportation engineering to design pavements
A1125.3	Classify various highway geometrical design elements
A1125.4	Apply traffic regulations for intersection design
A1125.5	Design flexible and rigid pavements as per IRC guidelines

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Course name: ENVIRONMENTAL ENGINEERING **A1126**

Course year:2020-21

A1126.1	Distinguish the physical, chemical and biological properties of the water samples A1126.2
A1126.2	Interpret various treatments for drinking water, waste water and solid waste
A1126.3	Design treatment plants by forecasting population for drinking water, waste water
A1126.4	Select appropriate distribution layout for municipal water supply
A1126.5	Measure and propose control measures for noise and air pollution in theenvironment

Course name: CONCRETE TECHNOLOGY LABORATORY **A1127**

Course year:2020-21

A1127.1	Evaluate various properties of cement and aggregate
A1127.2	Determine compressive strength of concrete by using non-destructive tests
A1127.3	Design concrete mix as per the site conditions and specifications of materials available
A1127.4	Assess the mechanical properties of concrete

Course name: TRANSPORTATION ENGINEERING LABORATORY **A1128**

Course year:2020-21

A1128.1	Identify basic engineering properties of various materials
A1128.2	Determine the grade and properties of bitumen
A1128.3	Conduct traffic studies for estimating traffic flow characteristics
A1128.4	Design traffic signals using Webster method
A1128.5	Evaluate longitudinal and cross-section details of roads

Course name: ENVIRONMENTAL ENGINEERING LABORATORY **A1129**

Course year:2020-21

A1129.1	Discuss about importance of water and its quality analysis
A1129.2	Analyze various physico-chemical parameters of water in case of quality requirements
A1129.3	Assess complete water quality for domestic supplies
A1129.4	Suggest various types of treatment methods required to purify raw water with different contaminants
A1129.5	Analyze biological parameters of water in case of quality requirements

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Course name: ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS
A1016 Course year:2020-21

A1016.1	Recall vocabulary and enhance accuracy in grammar
A1016.2	Understand and communicate effectively in speaking and in writing
A1016.3	Apply language structures to construct good relations
A1016.4	Identify and develop effective technical writing skills
A1016.5	Determine and develop personal presentation techniques
A1016.6	Design necessary skills to deliver presentation confidently for improving inrespective domains

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COURSE OUTCOMES

EEE III-I

COURSE NAME: POWER SYSTEMS A1218 YEAR: 2020-2021

A1218.1	Apply the knowledge of electromagnetic fields to calculate the parameters of transmission lines and underground cables.
A1218.2	Analyze the performance of various transmission lines, underground cables and overhead insulators.
A1218.3	Design mechanical transmission lines using corona phenomenon, Sag and Tension.
A1218.4	Analyze the distribution system, types of faults and protective devices.

COURSE NAME: POWER ELCTRONICS A1219
YEAR: 2020-2021

A1219.1	Illustrate the fundamental concepts and techniques used in power electronic circuits.
A1219.2	Analyze the performance and protection techniques of power electronic devices.
A1219.3	Analyze the operation and performance of AC-DC, DC-DC, DC-AC and AC-AC converters
A1219.4	Design a suitable power electronic converter circuit for given applications.
A1219.5	Apply PWM techniques to improve the performance of DC-DC and DC-AC converters.

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COURSE NAME : ELECTRICAL MEASUREMENTS A1220
YEAR: 2020-2021

A122O.1	Categorise various electrical instruments used for measuring electrical parameters.
A1220.2	Analyze the errors and compensations in various electrical measuring instruments
A122O.3	Measure current, voltage, power and energy in 1-phase and 3-phase circuits.
A1220.4	Estimate the unknown quantities of resistance, inductance and capacitance usingbridges
A1220.5	Apply transducers, digital meters and CRO for measuring electrical parameters

COURSE NAME : DIGITAL ELECTRONICS A1224
YEAR: 2020-2021

A1224.1	Perform arithmetic operations on different number systems and to apply the principles of Boolean algebra to minimize logic expressions.
A1224.2	Make use of k-map and tabulation methods to minimize boolean functions and toimplement with logic gates.
A1224.3	Analyze basic components used in digital systems such as adder and subtractor, decoder, encoder, multiplexer, flip-flops, registers and counters
A1224.4	Distinguish combinational and sequential logic in terms of their functions.
A1224.5	Design various PLDs such as ROMs, PALs, PLAs and PROMs.

COURSE NAME : POWER ELECTRONICS LABORATORY A1221
YEAR: 2020-2021

A1221.1	Analyze the performance characteristics of SCR firing and commutation circuits.
A1221.2	Plot the performance characteristics of AC-DC, DC-AC, DC-DC and AC-AC converters with R and RL Loads.
A1221.3	Apply the knowledge of MATLAB to plot the characteristics of full converter, inverterand forced commutation circuits

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COURSE NAME: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LABORATORY A1222 YEAR: 2020-2021

A1222.1	Estimate resistance, inductance and capacitance of electrical circuits using bridges anddielectric strength of transformer oil
A1222.2	Calculate the percentage error of various measuring instruments, LVDT, and resistancestrain gauge
A1222.3	Evaluate 3-Φ active power and reactive power of different loads.
A1222.4	Calibrate single phase energy meter and DC Crompton potentiometer.

COURSE NAME: ADVANCE ENGLISH LANGUAGE COMMUNICATION SKILLS A1016 YEAR: 2020-2021

A1016.1	Build inferences and predictions based on the information provided in the context
A1016.2	Choose academic vocabulary appropriately both in speaking and in writing.
A1016.3	Develop effective technical writing skills.
A1016.4	Construct necessary skills to deliver presentation confidently for improving in respective domains.
A1016.5	Apply language structures to construct good relations.

BTECH III-II

COURSE NAME : POWER SEMI CONDUCTOR DRIVES A1223 YEAR: 2020-2021

A12223.1	Identify a suitable electric drive system for desired application.
A12223.2	Apply 1-phase & 3- phase controlled converters for speed control operation of DC drives
A12223.3	Apply the knowledge of DC-DC Converter and dual converter for speed and torque control of DC Drives.
A12223.4	Apply the knowledge of AC voltage controller and cyclo-converter to control the speed of an induction motor and synchronous motor.

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COURSE NAME : POWER SYSTEM ANALYSIS A1224 YEAR: 2020-2021

A12224.1	Apply computational methods to determine transmission line parameters.
A12224.2	Apply load flow methods to examine the load flow studies.
A12224.3	Analyze symmetrical and unsymmetrical power system faults.
A12224.4	Apply the methods to improve the steady state and transient stability of powersystems.

COURSE NAME : MICROPROCESSORS AND MICROCONTROLLERS A1427 YEAR: 2020-2021

A1427.1	Analyze 8086 microprocessor and MSP430 microcontroller architectures
A1427.2	Develop programs using 8086 microprocessor and MSP430 microcontroller
A1427.3	Make use of peripherals of MSP430 to interface I/O devices
A1427.4	Apply serial communication protocols for interfacing serial devices.
A1427.5	Design embedded applications using MSP430 microcontroller

COURSE NAME: POWER SYSTEM SIMULATION LABORATORY A1230 YEAR: 2020-2021

A1230.1	Develop a program to simulate Ferranti effect
A1230.2	Develop a program to model transmission lines
A1230.3	Develop a program for formation Y-Bus and Z-Bus
A1230.4	Develop a program for load flow solution
A1230.5	Develop a program for short circuit analysis
A1230.6	Develop a Simulink model for evaluating transient stability

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COURSE NAME : MICROPROCESSORS AND MICROCONTROLLERS LABORATORY A1429 YEAR: 2020-2021

A1429.1	1 Develop assembly language programs using EMU8086 emulator.
A1429.2	Execute 8086 ALPs for arithmetic, logical, string, call operations.
A1429.3	Build programs of MSP430 using embedded C.
A1429.4	Interface LEDs push buttons, potentiometer to MSP430. A1429.5 Test and debug 8086 ALPs and MSP430 embedded C programs

COURSE NAME : PYTHON PROGRAMMING LABORATORY A1529 YEAR: 2020-2021

A1529.1	Apply fundamental programming concepts of python for solving general purpose problems
A1529.2	Implement sequences to solve complex problems
A1529.3	Build functions to increase code reusability
A1529.4	Implement modular programming for organized software development
A1529.5	Make use of exception handling for robust programming.

COURSE NAME: HUMAN VALUES & PROFESTIONAL ETHICS A1015 YEAR: 2020-2021

A1015.1	Apply human values and ethics in professional life
A1015.2	Develop the moral ideals to maintain good relationships with people.
A1015.3	Solve environmental related problems by keeping health of human being into consideration
A1015.4	Make used of the fundamental right stand human rights in life for individual dignity.
A1015.5	Build the sound health system both physically and mentally by practicing yoga, karate, sports etc.

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COURSE OUTCOMES

MECH III-I

Course name: THERMAL ENGINEERING-II A1322
Course year:2020-21

A1322.1	Apply power cycles and efficiency enhancement methods to generate power
A1322.2	Calculate the chimney height and draught for maximum discharge
A1322.3	Determine the characteristics of flow through nozzle
A1322.4	Construct the various velocity triangles of steam turbines
A1322.5	Analyze the working principle and performance of various thermal equipment

Course name: DYNAMICS OF MACHINERY A1323
Course year:2020-21

A1323.1	Apply gyro-principles to stabilize the motion of vehicle
A1323.2	Analyse the forces of the Flywheel in IC Engine
A1323.3	Estimate the range of speeds of various governors suitable for applications
A1323.4	Solve problems on balancing of rotating masses and reciprocating masses in V-engine and multi cylinder engines
A1323.5	Evaluate the critical speed of the shaft and simple vibration calculations of rotorsystems

Course name: DESIGN OF MACHINE ELEMENTS A1324
Course year:2020-21

A1324.1	Apply the design process and theories of failure for designing different machine elements
A1324.2	Solve the problems related to simple and complex components under different loads using Goodman's and Soderberg's criteria
A1324.3	Estimate the stress induced in riveted and bolted joints under different load conditions
A1324.4	Analyze the failures in shafts, cotter joint and knuckle joint subjected to variousloads
A1324.5	Design the keys, rigid and flexible couplings as per the standards suitable to applications

Course name: FLUID MECHANICS & HYDRAULIC MACHINES A1325
Course year:2020-21

A1325.1	Analyze properties of fluids under different conditions
A1325.2	Identify the fluid flow patterns using different equations
A1325.3	Determine fluid flow using devices and principles of fluid mechanics
A1325.4	Apply boundary layer concepts to various types of flow and forces exerted by jet onvanes
A1325.5	Estimate the performance of hydraulic turbines and pumps for various design considerations

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Course name: FLUID MECHANICS & HYDRAULIC MACHINES LABORATORY
A1326 Course year:2020-21

A1326.1	Analyze procedure for performance of various experiments
A1326.2	Calibrate flow discharge measuring devices used in pipes, channels and tanks
A1326.3	Analyze the fluid flow through pipes with different materials and sizes
A1326.4	Determine coefficient of discharge of fluid flow through pipes
A1326.5	Evaluate the performance analysis of various pumps and turbines

Course name: MACHINES TOOLS LABORATORY A1327
Course year:2020-21

A1327.1	Identify various machine tools used in machine shop
A1327.2	Distinguish the constructional features and operations of general purpose machines
A1327.3	Determine the sequence of operations to process a job
A1327.4	Make use of various machining operations to perform metal cutting
A1327.5	Prepare models using required machine tools

Course name: PRODUCTION DRAWING PRACTICE A1328
Course year:2020-21

A1328.1	Construct the conventional representation of different materials used In engineeringpractice
A1328.2	Identify the machine elements and designation of material
A1328.3	Apply the drawing techniques to draw various parts of assembly drawing, tolerances, roughness
A1328.4	Improve visualization ability of surface roughness and its indications with respect tothe material surface
A1328.5	Plan the production drawings based on design constraints

Course name: PROFESSIONAL VALUES & ETHICS A1015 Course year:2020-21

A1015.1	Apply human values and ethics in professional life
A1015.2	Develop the moral ideals to maintain good relationships with people
A1015.3	Solve environmental related problems by keeping health of human being into consideration
A1015.4	Make use of the fundamental rights and human rights in life for individual dignity
A1015.5	Build the sound health system both physically and mentally by practicing yoga,karate, sports etc

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B Tech III-II

Course name: OPERATIONS RESEARCH **A1329**
Course year:2020-21

A1329.1	Apply various Operations Research models and methods to solve real world problems
A1329.2	Solve Linear Programming, assignment, sequencing, game theory, queuing, transportation and project management problems for optimum solution
A1329.3	Evaluate various alternatives available to find optimal solution for real world problems
A1329.4	Choose the best strategies to maximize the profit or minimize loss in the presence ofa competitor
A1329.5	Decide the best operating policy for the efficient use of resources.

Course name: DESIGN OF TRANSMISSION SYSTEMS **A1330**
Course year:2020-21

A1330.1	Assess the type of stresses induced in crane hooks, C-clamps and drives subjected tovarious loadings
A1330.2	Design different types of bearings for suitable applications
A1330.3	Design springs and power screws under different load conditions as per the practicalsituation
A1330.4	Solve the problems related to spur and helical gears for power transmission
A1330.5	Analyze the stresses induced in IC engine parts subjected to various loads

Course name: METAL FORMING PROCESS **A1331**
Course year:2020-21

A1331.1	Apply hot working and cold working processes to workpiece for obtaining a final product
A1331.2	Apply the mechanism of deformation for different metals
A1331.3	Analyze the effect of process parameters influencing metal forming
A1331.4	Identify the metal forming process used for given application
A1331.5	Examine effects of friction, lubrication and causes of common defects in metal forming

Course name: HEAT TRANSFER **A1332** **Course year:2020-21**

A1332.1	Apply laws of heat transfer in thermal analyses of engineering systems
A1332.2	Calculate the amount of heat transfer in conduction, convection and radiation modes
A1332.3	Discuss the concept of conduction heat transfer and its applications
A1332.4	Analyze the free and forced convective heat transfer for fluids
A1332.5	Analyze the concept of radiative heat transfer between black bodies and grey bodies

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Course name: HEAT TRANSFER LABORATORY A1333 Course year:2020-21

A1333.1	Analyze thermal conductivity in various materials
A1333.2	Calculate heat transfer coefficient in various materials
A1333.3	Select appropriate materials for improving effectiveness of heat transfer
A1333.4	Test the performance and there by improve effectiveness of heat exchanger
A1333.5	Calculate emissivity and Stefan's Boltzmann constant for various bodies through radiation

Course name: CAD/CAM LABORATORY A1334 Course year:2020-21

A1334.1	Construct complex geometries of machine components in sketcher mode
A1334.2	Create programs to generate analytical and synthetic curves used in engineeringpractice
A1334.3	Plan 2D and 3D drawings based on design constraints
A1334.4	Applying CAD/CAM concept to product design and manufacturing
A1334.5	Analyze G and M codes for turning and milling components

Course name: ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS A1016 Course year:2020-21

A1016.1	Recall vocabulary and enhance accuracy in grammar
A1016.2	Understand and communicate effectively in speaking and in writing.
A1016.3	Apply language structures to construct good relations
A1016.4	Identify and develop effective technical writing skills
A1016.5	Determine and develop personal presentation techniques
A1016.6	Design necessary skills to deliver presentation confidently for improving in respective domains

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REGULATION R18
COURSE OUTCOMES

ECE III-I

Course name: MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
A1427 Course year:2020-21

A1701.1	Analyze the concepts of managerial economics and financial accounting to make better decisions in the organization
A1701.2	Analyze the demand, production, cost and break even to know interrelationship among variables and their impact
A1701.3	Classify the market structure to decide the fixation of suitable price
A1701.4	Apply capital budgeting techniques to select best investment opportunity
A1701.5	Analyze and prepare financial statements to assess financial health of business

Course name: ANATENNAS AND WAVE PROPAGATION A1418
Course year:2020-21

A1418.1	Compare the performance of different antennas using antenna parameters
A1418.2	Analyze dipole and array antennas by computing fields, radiated power and radiation resistance
A1418.3	Select appropriate antenna for a specific application like TV, AM/FM radio, radar, satellite link
A1418.4	Design horn, helical and reflector antennas for VHF, UHF and microwave communication applications
A1418.5	Formulate the design equations of microstrip antennas for a given application

Course name: DIGITAL COMMUNICATIONS SYSTEM A1419
Course year:2020-21

A1419.1	Analyze different digital modulation techniques to convert analog signals to digital form.
A1419.2	Distinguish between baseband and passband transmission techniques in terms of SNR and BER.
A1419.3	Examine the concepts of geometric representation of signals and constellation diagrams
A1419.4	Compare digital carrier modulation schemes in terms of bandwidth, complexity and spectral efficiency.
A1419.5	Interpret the differences between linear block codes and convolutional codes for noisy and noiseless channels.

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Course name: LINEAR INTEGRATED CIRCUIT APPLICATIONS A1420
Course year:2020-21

A1420.1	Analyze the characteristics of operational amplifier.
A1420.2	Design different amplifier and oscillator circuits using op-amp.
A1420.3	Make use of IC 555 and PLL effectively in communication systems.
A1420.4	Construct different active filters using op-amp.
A1420.5	Design different analog to digital and digital to analog converters effectively.

Course name: DIGITAL DESIGN HROUGH VERILOG HDL LABORATORY A142
Course year:2020-21

A1421.1	Develop hardware digital designs using Verilog HDL
A1421.2	Use various modeling styles appropriately for digital design
A1421.3	Design, simulate and synthesize combinational circuits using Verilog descriptions
A1421.4	Design, simulate and synthesize sequential circuits using Verilog descriptions
A1421.5	Use finite state machines to design complex circuits

Course name: DIGITAL COMMUNICATION SYSTEMS LABORATORY A1422
Course year:2020-21

A1422.1	Demonstrate the working of various digital modulation and demodulation schemes.
A1422.2	Design various digital modulation schemes to obtain desired modulation index.
A1422.3	Analyze the performance of time division multiplexing and demultiplexing.
A1422.4	Study and verify sampling theorem.
A1422.5	Verify digital modulation techniques using MATLAB.

Course name: LINEAR INTEGRATED CIRCUIT APPLICATIONS LABORATORY A1422 Course year:2020-21

A1422.1	Demonstrate the working of various digital modulation and demodulation schemes.
A1422.2	Design various digital modulation schemes to obtain desired modulation index.
A1422.3	Analyze the performance of time division multiplexing and demultiplexing.
A1422.4	Study and verify sampling theorem.
A1422.5	Verify digital modulation techniques using MATLAB.

Course name: ADVANCED ENGLISH LANGUAGE COMMUNICATIO SKILL A1016
Course year:2020-21

A1016.1	Build inferences and predictions based on the information provided in the context.
A1016.2	Choose academic vocabulary appropriately both in speaking and in writing.
A1016.3	Develop effective technical writing skills.
A1016.4	Construct necessary skills to deliver presentation confidently for improving in respective domains.
A1016.5	Apply language structures to construct good relations

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III-II

Course name: DIGITAL SINGNAL PROCESSING A1425 Course year:2020-21

A14251	Apply the Discrete Fourier Transform to represent the signals in frequency domain.
A1425.2	Analyze various DFT algorithms and their applications
A1425.3	Analyze various realization forms of FIR and IIR Filters.
A1425.4	Design digital FIR and IIR filters and analyze their performances
A1425.5	Apply the concepts of multirate signal processing to implement digital filters

Course name: CMOS VLSI DESIGN A1426 Course year:2020-21

A1426.1	Analyze the electrical properties of MOS transistors
A1426.2	Apply various CMOS processing techniques to fabricate NMOS, PMOS and CMOS devices.
A1426.3	Analyze the DC and transient characteristics of CMOS logic gates.
A1426.4	Build logic circuits using transmission gate logic.
A1426.5	Make use of charge leakage and charge sharing concepts to design dynamic logic circuits.

Course name: MICROPROCESSOR AND MICROCONTROLLER A1427
Course year:2020-21

A1427.1	Analyze 8086 microprocessor and MSP430 microcontroller architectures.
A1427.2	Develop programs using 8086 microprocessor and MSP430 microcontroller
A1427.3	Make use of peripherals of MSP430 to interface I/O devices.
A1427.4	Apply serial communication protocols for interfacing serial devices.
A1427.5	Design embedded applications using MSP430 microcontroller.

Course name: JAVA PROGRAMMING LABORATORY A1539
Course year:2020-21

A1539.1	Apply of data types, variables and control structures to solve problems
A1539.2	Apply object-oriented concepts to solve problems including generating series primes, searching a pattern in a file.
A1539.3	Design, write, debug and execute applet programs using Integrated Development Environment.
A1539.4	Develop programs using threads and swing concepts.
A1539.5	Apply I/O stream and networking classes to develop client and server interaction.
A1539.6	Apply the concepts and create solution effectively as a member or leader in a team during the development of a software project.

Course name: CMOS VLSI DESIGN LABORATORY A1428
Course year:2020-21

A1428.1	Construct the schematics and symbols of logic circuits using EDA tool.
A1428.2	Analyze the characteristics of CMOS logic circuits using suitable simulator.
A1428.3	Construct the layouts for complex CMOS logic circuits following DRC and ERC rules.
A1428.4	Analyze VLSI circuit timing to estimate and compute the leakage power consumption of a VLSI circuit.
A1428.5	Evaluate the performance of CMOS logic circuits in terms of power, speed and area.

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Course name: MPMC LABORATORY A1429

Course year:2020-21

A1429.1	Develop assembly language programs using EMU8086 emulator.
A1429.2	Execute 8086 ALPs for arithmetic, logical, string, call operations.
A1429.3	Build programs of MSP430 using embedded C.
A1429.4	Interface LEDs, push buttons, potentiometer to MSP430.
A1429.5	Test and debug 8086 ALPs and MSP430 embedded C programs.

Course name: HUMAN VALUES AND PROFESSIONAL ETHICS A1015

Course year:2020-21

A1015.1	Apply human values and ethics in professional life.
A1015.2	Develop the moral ideals to maintain good relationships with people.
A1015.3	Solve environmental related problems by keeping health of human being into consideration.
A1015.4	Make use of the fundamental rights and human rights in life for individual dignity.
A1015.5	Build the sound health system both physically and mentally by practicing yoga, karate, sports etc.

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REGULATION R18
COURSE OUTCOMES

CSE III-I

Course name: **COMPUTER NETWORKS** **A1518** Course year:2020-21

A1518.1	Apply the networking concepts in configuring the systems.
A1518.2	Illustrates error handling mechanism in data link layer.
A1518.3	Analyze the routing algorithms in finding the shortest path.
A1518.4	Apply transport protocols in network communications.
A1518.5	Implements domain name service and network security in the communication seg- ment.

Course name: **DATA MINING** **A1519** Course year:2020-21

A1519.1	Apply the principles of business intelligence in the commercial segment
A1519.2	Make use of pre-processing techniques for data organization
A1519.3	Implement association, clustering and rule based mining for Market based analysis
A1519.4	Analyze the data mining classification technique for data differentiation
A1519.5	Design the unsupervised clustering algorithms for data analysis

Course name: **COMPUTER NETWORKS LABORATORY** **A1524** Course year:2020-21

A1524.1	Apply the network principles in establishing network communications
A1524.2	Make use of layered network architecture functionalities in connecting systems
A1524.3	Apply mathematical concepts in solving the computational problems
A1524.4	Analyze performance of protocols in information exchange
A1524.5	Compare routing algorithms for dynamic routing

Course name: **DATA MINING LABORATORY** **A1522** Course year:2020-21

A1522.1	Execute data mining algorithms for extraction of appropriate datasets
A1522.2	Apply data preprocessing techniques on raw input data for data cleansing
A1522.3	Appraise the classification techniques on large datasets for differentiation
A1522.4	Apply the data mining algorithms to perform association rule mining and clustering tasks
A1522.5	Differentiate the outlier data from cluster data for statistical analysis

Course name: **PYTHON PROGRAMMING LABORATORY** **A1529** Course year:2020-21

A1529.1	Apply fundamental programming concepts of python for solving general purpose prob-lems
A1529.2	Implement sequences to solve complex problems
A1529.3	Build functions to increase code reusability
A1529.4	Design web applications using Django framework

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Course name: **HUMAN VALUES & PROFESSIONAL ETHICS A1015** Course year:2020-21

A1015.1	Apply human values and ethics in professional life
A1015.2	Develop the moral ideals to maintain good relationships with people
A1015.3	Solve environmental related problems by keeping health of human being into considera- tion
A1015.4	Make use of the fundamental rights and human rights in life for individual dignity
A1015.5	Build the sound health system both physically and mentally by practicing yoga, karate,sports etc

CSE III-II

Course name: **CLOUD COMPUTING I A1520** Course year:2020-21

A1520.1	Analyze cloud delivery models for better architecture.
A1520.2	Implement infrastructure as a service model for industrial applications.
A1520.3	Organize the cloud platform model for optimization services.
A1520.4	Develop various application software with software as service.
A1520.5	Design cloud computing reference architecture for deliverymodels

Course name: **SOFTWARE TESTING TECHNIQUES A1524** Course year:2020-21

A1524.1	Derive test cases for any given problem
A152.2	Compare the different testing techniques to produce quality software
A1524.3	Identify the problem to its suitable testing model for errordetection
A1524.4	Apply the appropriate technique for the design of data flow and integration of software
A1524.5	Create appropriate document for the software artifact

Course name: **ARTIFICIAL INTELLIGENCE A1526** Course year:2020-21

A1526.1	Apply suitable search strategies in finding better solutions for a given problem
A1526.2	Analyze performance of an algorithm as per given parameters
A1526.3	Analyze the efficient problem state space search for a problem
A1526.4	Implement the appropriate AI techniques to solve uncertainty problems
A1526.5	Apply AI techniques to solve real time problems

Course name: **SOFTWARE TESTING LAB A1527** Course :2020-21

A1527.1	Identify the customer requirements for the given problem
A1527.2	Apply decision table testing for select problems
A1527.3	Derive different test cases for any given problem
A1527.4	Apply the appropriate testing technique for the design of flow graphs
A1527.5	Create software testing document for the software artifact

Course name: **ARTIFICIAL INTELLIGENCE LAB A152** Course :2020-21

A1528.1	Execute statistical problems to produce appropriate solutions
A1528.2	Categorize the problem for selection of an appropriate algorithm
A1528.3	Compare computational complexity of AI problems for better efficiency
A1528.4	Demonstrate various AI algorithms based on empirical and theoretical proofs for per- formance statistics

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Course name: **CLOUD COMPUTING LAB A1523** course year:2020-21

A1523.1	Develop and deploy applications for better cloud utility
A1523.2	Design web services for modern commercial applications
A1523.3	Analyze the performance, scalability, and availability of the underlying cloud technolo-gies for business requirements
A1523.4	Implement software installation for utility of its applications
A1523.5	Compare various cloud computing platforms for better cloud services

Course name: **ADVANCED ENGLISH LANGUAGE COMMUNICATIONS A1016**

Course year:2020-21

A1016.1	Recall vocabulary and enhance accuracy in grammar.
A1016.2	Understand and communicate effectively in speaking and in writing.
A1016.3	Apply language structures to construct good relations.
A1016.4	Identify and develop effective technical writing skills.
A1016.5	Determine and develop personal presentation techniques.
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REGULATION R15
COURSE OUTCOMES

CIVIL IV - I

COURSE NAME: FINITE ELEMENT METHODS IN CIVIL ENGINEERING **COURSE YEAR:2021**

CO-1	Know introductory basic principles and approaches for solving FEM problems in different fields
CO-2	Formulate FEM model for simple problems
CO-3	Write interpolation functions to higher order isoperimetric elements
CO-4	To derive element matrices for applying the principles to find stresses in bars and trusses
CO-5	To solve problems of bars, trusses, CST Elements using FEM

COURSE NAME: TRANSPORTATION ENGINEERING -II **COURSE YEAR:2021**

CO-1	Have you understood the basic concepts of railway engineering
CO-2	Can you determine the geometric design of railway track, stations and yards in railway stations
CO-3	Have you understood about design and construction of dock and breakwater in harbors
CO-4	Have you understood about Jetties and wharves of major parts in harbor for loading and unloading cargo and concept of dredging
CO-5	Have you understood the basic concepts of railway engineering

COURSE NAME: ENVIRONMENTAL ENGINEERING-II **COURSE YEAR:2021**

CO-1	Ability in coming to a conclusion how air pollution is haunting our eco systems globally and how these effects could be reduced.
CO-2	How to control air pollution, by learning air emission standards, how far we can innovate new techniques in reducing air pollution and to check the ommitive quantity with the standards.
CO-3	Ability to learn how to reduce water pollution in an ethical and scientific way through mathematical approach.
CO-4	Ability to learn in what kind of danger we are throwing our mother earth in the name of industrialization and its remedies.
CO-5	Ability to manage solid wastes by segregation and backyard type techniques so, as to understand recyclable and non recyclable waste and proceeding.

COURSE NAME: WATER RESOURCES ENGINEERING-2 **COURSE YEAR:2021**

CO-1	Design various canal systems
CO-2	Design head and cross regulator structures
CO-3	Identify various types of reservoir and their design aspects
CO-4	By the Establishes the understanding of cross drainage works and its design
CO-5	Design different types of dams

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COURSE NAME: GROUND IMPROVEMENT TECHNIQUES	COURSE YEAR:2021
CO-1	Able to understand the basic concepts of ground improvement techniques
CO-2	Able to understand problems of Expansive soils & Foundation Techniques in expansive soils
CO-3	Student can able to gain the knowledge in grouting methods & hydraulic fracturing in soils.
CO-4	Study of stabilization on Highway foundation in a hilly terrain with high rainfall data
CO-5	To know about the application of sodium silicate stabilization & Gypsum stabilization

COURSE NAME: BRIDGE ENGINEERING	COURSE YEAR:2021
CO-1	Investigate a site for construction of a bridge
CO-2	Design a box culvert subjected to IRC Class AA loading
CO-3	Analyze and design simply supported deck slab bridge subjected to class AA tracked vehicle loading
CO-4	Able to design a T-beam bridge subjected to class AA tracked vehicle loading
CO-5	Design a deck type welded plate girder for a single line broad gauge track

COURSE NAME: CAD LAB	COURSE YEAR:2021
CO-1	Analysis of 2D Truss using STAAD Pro
CO-2	Analysis of 2D and 3D Rigid Frames using STAAD Pro
CO-3	Analysis of 3D pin jointed frames using ANSYS
CO-4	Analysis of suspension cables using ANSYS
CO-5	Design of Footings and Retaining Walls using STAAD Pro

COURSE NAME: ENVIRONMENTAL ENGINEERING lab	COURSE YEAR:2021
CO-1	Determination of pH and Turbidity
CO-2	Determination of Conductivity and Total dissolved solids.
CO-3	Determination of Alkalinity/Acidity.
CO-4	Determination of Chlorides.
CO-5	Determination and Estimation of total solids, organic solids and inorganic

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CIVIL IV-II

COURSE NAME: URBAN TRANSPORTATION PLANNING **COURSE YEAR:2021**

CO-1	Understand the concept of Travel Demand and the factors affecting it
CO-2	Understand the different stages of Urban Transportation Planning and
CO-3	Assess the economic impact of new Transportation plans
CO-4	Understand various mathematical models associated with each stage
CO-5	Assess the Concepts of economic evaluation of transportation plans.

COURSE NAME: ENVIRONMENTAL IMPACT ASSESSMENT & MANAGEMENT **COURSE YEAR:2021**

CO-1	Perform a critical quality review of an EIA and EIS;
CO-2	Structure the EIA working process considering the need for interdisciplinarity;
CO-3	Perform the screening and scoping of an EIA, based on existing requirements, evaluate the impacts and draw meaningful conclusions fromthe results of the EIA;
CO-4	Clarify the concept of EIA and its application in an international context to those involved in or affected by the EIA process;
CO-5	Interpretate an EIA, present its conclusions and translate its conclusions into actions.

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REGULATION R15
COURSE OUTCOMES

EEE IV-I

Course Name: Distribution of Electric Power C401 Course Year: 2020-21

C401.1	Understand the concepts of load modeling, Coincidence Factor, Loss Factor, types of loads and their characteristics
C401.2	Analyze and explain the various design considerations of DC and AC Distribution Systems
C401.3	Identify the Location, Rating and benefits derived through optimal location of Substations
C401.4	Interpret the different power factor improvement techniques and Voltage control methods
C401.5	Determine the solutions of voltage drop and power loss calculations and manual methods of radial network
C401.6	Interpret the concepts of different types of faults, over current protective devices and their coordination of various protective devices

Course Name: Digital Signal Processing C402 Course Year: 2020-21

C402.1	Understand the concepts digital signal processing, discrete time signals, discrete time systems and implement the time domain and frequency domain representation of discrete time systems
C402.2	Compute the Fourier series, discrete time Fourier transform (DTFT) and circular convolution of discrete-time signals
C402.3	Interpret the design of the Fast Fourier Transforms (FFT) in Radix2 decimation in time and decimation in frequency FFT algorithms
C402.4	Employ Z transforms and discrete time Fourier transforms to analyze a digital system along with designing and implementation of various FIR and IIR filters
C402.5	Recognize the Multi-rate digital signal processing, DSP Architectures and applications
C402.6	Apply the various digital filters to digitized sound and images

Course Name: Fundamentals of HVDC & FACTS C403 Course Year:2020 -21

C403.1	Understand the HVDC links and their applications in transmission systems and also know about the schemes to control the HVDC link by firing angle control, current control and extinction angle control
C403.2	Identify the various types of harmonics and filters present in AC and DC systems
C403.3	Analyze the modeling of DC and AC converters and their various solution methodologies
C403.4	Carry out the detailed analysis of power flow in AC transmission systems and types of FACTS devices in transmission systems
C403.5	Describe the types of Shunt and series FACTS Controllers along with their operational characteristics
C403.6	Interpret the various types of combined Shunt and Series controllers along with their operation

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Course Name: Switch gear and Protection/Power System Protection C404
Course Year:2020-21

C404.1	Understand the fundamental principles of fuse and circuit breakers along with their ratings and specifications
C404.2	Realize the basic requirements of relays as primary and backup protection along with their constructional details
C404.3	Analyze the static and microprocessor based relays along with their specifications, advantages and disadvantages
C404.4	Interpret the various techniques involves in the generator and transformer protection against faults in the system
C404.5	Explain the techniques involves in the protection of feeders and transmission lines
C404.6	Describe the causes for over-voltages in power system and also explain the various protective schemes for the protection from over-voltages

Course Name: Instrumentation C405 Course Year: 2020-21

C405.1	Understand the various concepts in characteristics of signals and errors in measurements along with signals and their representation for electronic instruments
C405.2	Carry out the analysis of data transmission and telemetry system which is intermediate stage in instrumentation.
C405.3	Understand the data acquisition system components and record the data in analog and digital format
C405.4	Analyze the signals employing signal analyzers and learn the measurement of non electrical quantities like flow and pressure.
C405.5	Realize the different types of transducers along with their advantages and disadvantages which are primary sensing element in instrumentation
C405.6	Implement the Measurement of non electrical quantities employing various instruments

Course Name: Soft computing techniques C406 Course Year: 2020-21

C406.1	Understand the basic principles involved in artificial neural networks along with its characteristics and applications
C406.2	Identify the Various learning mechanisms of neural networks which involve supervised learning and unsupervised learning
C406.3	Interpret the basic fundamental operations on Fuzzy sets and its comparison to crisp set theory
C406.4	Design fuzzy logic controller for any system involving the fuzzification and defuzzification concepts
C406.5	Perform the technique of genetic algorithm to a mathematical problem by understanding the various operators in genetic algorithm
C406.6	List out the application of various Soft Computing Techniques in electrical applications

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Course Name: Microprocessors and microcontrollers lab C407 Course Year:2020-21

C407.1	Perform arithmetic calculations involving addition, subtraction, multiplication and division employing 8086 Processor
C407.2	Implement the logical operations involving shift and rotate, BCD to ASCII conversion employing 8086 processor
C407.3	Employ 8086 processor for Dos/BIOS programming involving display of characters and strings
C407.4	Realize the string operation and instruction prefix involving move block, reverse string, sorting, inserting using 8086 processor
C407.5	Carry out the process of interfacing using 8259, 8279 and 8251
C407.6	Perform various operations employing 8051 Micro controller

Course Name: Power Electronics Lab C408 Course Year:2020-21

C408.1	Plot the output waveforms for different firing angles by carrying out experiments on single phase Half controlled and Fully controlled converters with R and RL loads.
C408.2	Depict the output waveforms for different firing angles by carrying out experiments on three phase Half controlled bridge converter with R load.
C408.3	Analyze the output waveforms for different firing angles by conducting experiments on single phase AC voltage controller and Cyclo converter with R and RL loads.
C408.4	Understand the operation of single phase series and parallel inverters with R and RL loads.
C408.5	Construct the output waveforms for Buck chopper and Resonant pulse commutation circuit using PSIM.
C408.6	Design single phase A.C voltage controller and fully controlled bridge converter with RLE loads

Course Name: Utilization of Electrical Energy C409 Course Year:2020-21

C409.1	Explain the basic principles of light control and Different sources of Light
C409.2	Understand the various electric heating methods, equipment required for welding and also the difference between AC and DC welding .
C409.3	Interpret about the movement of a train and corresponding arrangements and also the features of a Traction Motor.
C409.4	Analyze the methods of controlling the trains electrically, terms related to electric traction and calculations of various parameters related to it
C409.5	Understand the different types of loads existing in industries and the techniques to equalize the loads under sudden rise in the magnitude of load
C409.6	Carry out a detailed review of existing Electric Traction Systems in India and analysis of Energy consumption in Electric Traction

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EEE-IV-II

Course Name: Principles of Power Quality/Power Quality C410 Course Year:2020-21

10.1	Understand the importance of Power Quality and obtain a brief idea of power quality problems
C410.2	Estimate voltage sag performance and analyze the solutions that can be for applied for improving power quality at end user location
C410.3	Analyze the principles of over voltage protection and operation of devices used against over voltages
C410.4	Understand the nature of harmonics and evaluate certain methods to control harmonics distortions by applying various principles
C410.5	Study the various principles and applications of voltage regulation
C410.6	Learn about monitoring considerations that include operation of monitoring equipment, methods of data acquisition and storage, analysis and interpretation of bench marking process.

Course Name: PLC & DCS-Its applications C411 Course Year:2020-21

C411.1	Explain the operations and applications of central processing units and input / output modules in Programmable Logic Controllers
C411.2	Acquire knowledge on the advantages, usage and applications of Programmable Logic Controllers
C411.3	Exhibit knowledge of codes; BCD, ASCII, GRAY and EBCDIC utilized for numbers, characters and control functions pertaining to Programmable Logic Controllers
C411.4	Understand the concepts of PLC Programming and data Handling functions
C411.5	Interpret the purpose, function and applications of Programmable Logic Controllers along with the usage and applications of timers and counters
C411.6	Build and write programs employing Programmable Logic Controllers for spray processing systems and also two axis robot control systems

Course Name: Energy Auditing and demand side management C412 Course Year:2020-21

C412.1	Understand the concept of demand –side management for residential, commercial and industrial energy users and Obtain an over view of the different types of demand-side measures
C412.2	Depict how housekeeping and preventative maintenance in commerce and industry can be used to reduce the energy demand
C412.3	Describe energy auditing and routine data collection and monitoring and to indicate their benefits
C412.4	Outline information dissemination on demand-side management and obtain an overview of the major implementation challenges for DSM Programmers
C412.5	Understand the challenges facing the implementation of demand-side management
C412.6	Interpret the benefits of good reliable data collection for regular performance analysis, and as an essential part of energy auditing

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Course Name: Seminar C413 Course Year:2020-21

C413.1	Acquire knowledge on the latest topics that are present in the field of electrical engineering
C413.2	Perform survey on the literature to be collected in order to be presented as a presentation
C413.3	Communicate effectively in verbal form while delivering the presentation
C413.4	Prepare a documentary report highlighting the information on the topic presented in the seminar

Course Name: Project Work C414 Course Year: 2020-21

C414.1	Identify the real world problem subject to electrical engineering
C414.2	Analyze the problem, identify and define the computing requirements appropriate to its solutions
C414.3	Develop the knowledge and skills to do advanced studies and research in Electrical and Electronics engineering discipline
C414.4	Use Modern tools and advanced programming techniques to implement the project in hardware or software format
C414.5	Communicate effectively in both verbal and written form while completing the project and delivering the presentation
C414.6	Contribute effectively as a member in team and also draft the technical report at the time of completion

Course Name: Embedded Systems C415 Course Year: 2020- 21

C415.1	Have you been explained the basic concepts of embedded systems and introduction to advanced microcontrollers like MSP 430
C415.2	Have you Understood the various architectural feature of MSP 430, different peripherals and their functionalities
C415.3	Can you Interpret the usage of ADC , PWM concepts to resolve the real time applications using MSP 430
C415.4	Can you Analyze the various serial communication protocol standards.
C415.5	Have you Understood the different types of case studies to analyze the importance of MSP 430 in real time.
C415.6	Have you carried out a detailed review of new technology IoT and its usage in solving of real world problems

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REGULATION R15
COURSE OUTCOMES

MECHANICAL IV-I

Course Name: **15A52601- MANAGEMENT SCIENCE**

15A52601.1	Apply the concepts, theories, and principles of management in professional life.
15A52601.2	Design suitable organization structure for managing the operations in the organization
15A52601.3	Apply principles of management to the various functional areas of an organization such as Human Resource, Marketing and Production
15A52601.4	Evaluate cost and time of each business project by using PERT and CPM techniques.
15A52601.5	Formulate the new strategies that enhance competitive edge.

Course Name: **15A03701– AUTOMOBILE ENGINEERING**

15A03701.1	Identify components of various automobile systems including turbo chargers and super chargers
15A03701.2	Examine the environmental implications of automobile emissions
15A03701.3	Analyze brakes, steering and suspension systems of engine for better performance.
15A03701.4	Analyze the effect of electrical and transmission system on the performance of an automobile engine.
15A03701.5	Discuss the purpose and methods of various automobile systems and their applications.

Course Name: **15A03702– CAD-CAM**

15A03702.1	understand the basic concepts Automation, components of CAD/CAM, input and output components of CAD, Steps involved in computer aided design.
15A03702.2	understand the geometric model of the component in CAD technology of Computer graphics. The techniques of raster technology, scan Conversion, clipping, removal of hidden lines and hidden surfaces, color, shading and texture.
15A03702.3	Analyze various requirements of information that are generated during geometric modeling stage, various types and its applications. Mathematical representations of curves used in geometric construction.
15A03702.4	understand the principle of NC, CNC , Machining Centre and various methods of part programming.

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Course Name: **15A03703– METROLOGY AND MEASUREMENTS**

15A0370.3.1	understand the Limits, Fits and Tolerance. Indian standard system.
15A03703.2	study the different types of Comparators, optical measuring instruments, flatness measurement methods and measuring methods of surface roughness.
15A03703.3	understand, Screw thread elements and measuring methods, Gear tooth profile measurement, CMM, Alignment tests on lathe, milling and drilling machine tools. .
15A03703.4	understand working of various instruments used for measuring for displacement, temperature and pressure.
15A03703.5	understand working of various instruments used for measuring for flow, speed, stress, strain and Vibration

Course Name: **15A03704– CAD-CAM**

15A03704.1	Make use of Terminologies associated with refrigeration and also the basic principles of Refrigeration.
15A03704.2	identify each of the components in the domestic refrigerator, and concepts of sub-cooling and super heating to improve the COP of various systems
15A03704.3	Analyze air-conditioning processes using the principles of psychrometry
15A03704.4	Distinguish the technical information required related to all types of domestic, commercial and industrial systems
15A03704.5	Evaluate the cooling and heating load calculations in an air-conditioning system

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Course Name: **15A03706– MODERN MANUFACTURING METHOD**

15A03706.1	Apply the selection for processing of different materials and the range of applications with the importance of modern manufacturing technologies
15A03706.2	Make use of the basic mechanism, working principle, process parameters, Applications, limitations and advantages of electro chemical machining (ECM), electrochemical grinding (ECG), & Chemical Machining CM
15A03706.3	Apply the basic mechanism, working principle, process parameters, Applications, limitations and advantages of Electric Discharge machining
15A03706.4	Analyze basic basic mechanism, working principle, process parameters, Applications, limitations and advantages of Electron Beam Machining (EBM) &Laser Beam Machining (LBM)
15A03706.5	Applying the above mechanisms for various materials based on the application

Course Name: **15A03708- Automation and Robotics**

15A03708.1	Apply the knowledge in management tools to apply in technical organizations.
15A03708.2	Make use of plant layout design to facilitate material flow and processing of a product in the most efficient manner through the shortest possible time.
15A03708.3	Apply various work study techniques towards productivity improvement in industrial and in real life environment.
15A03708.4	Determine the inventory and to be able to apply selected techniques for its control and management under different circumstances.
15A03708.5	Apply quality improvement techniques and methods for improvement of quality of product and process

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Course Name: **15A03709– PRODUCTION AND OPERATIONS MANAGEMENT**

15A03709.1	Apply the knowledge in management tools to apply in technical organizations.
15A03709.2	Apply forecasting techniques to predict future demand and other parameters
15A03709.3	Make use of plant layout design to facilitate material flow and processing of a product in the most efficient manner through the shortest possible time
15A03709.4	Apply quality improvement techniques and methods for improvement of quality of product and process
15A03709.5	Determine the inventory and to be able to apply selected techniques for its control and management under different circumstances

Course Name: **15A03710 CAD/CAM LABORATORY**

15A03710.1	Construct complex geometries of machine components in sketcher mode.
15A03710.2	Create programs to generate analytical and synthetic curves used in engineering practice.
15A03710.3	Plan 2D and 3D drawings based on design constraints
15A03710.4	Applying CAD/CAM concept to product design and manufacturing.
15A03710.5	Analyze G and M codes for turning and milling components.

Course Name: **15A03711– METROLOGY AND MEASUREMENTS LABORATORY**

15A03711.1	Apply the procedures of alignment on lathe and drilling machine
15A03711.2	Make use of bevel protractor, sine bars for measuring the angles
15A03711.3	Understand the Seismic pickup for the measurement of vibration
15A03711.4	Analyze the speed using photo and magnetic speed pickups
15A03711.5	Analyze displacement and angular measurement using LVDT and Capacitive Transducer

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REGULATION R 15
COURSE OUTCOMES

MECHANICAL IV - II

Course Name: 15A03801– INDUSTRIAL ENGINEERING

15A03801.1	Apply the knowledge in management tools to apply in technical organizations..
15A03801.2	Make use of plant layout design to facilitate material flow and processing of a product in the most efficient manner through the shortest possible time.
15A03801.3	Apply various work study techniques towards productivity improvement in industrial and in real life environment.
15A03801.4	Determine the inventory and to be able to apply selected techniques for its control and management under different circumstances.
15A03801.5	Apply quality improvement techniques and methods for improvement of quality of product and process.

Course Name: 15A03804– POWER PLANT ENGINEERING

15A03804.1	Explain power plant economics and environmental considerations
15A03804.2	Describe working components of a steam power plant
15A03804.3	Illustrate the working mechanism of diesel and gas turbine power plants.
15A03804.4	Summarize types of renewable energy sources and their working principle.
15A03804.5	Demonstrate the working principle of nuclear power plants.

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REGULATION R-15

COURSES OUTCOMES

ECE IV-I

Course name: OPTICAL FIBRE COMMUNICATION 15A04701 Course year:2020-21

15A04701.1	Analyze different optical propagation methods and understand cylindrical fibers and mode configurations
15A04701.2	Understand the different fabrication methods used in optical fibers and factors causing signal distortion
15A04701.3	Evaluate the signal degradation at fiber joints and fiber splices
15A04701.4	Describe the characteristics of optical sources and detectors, and power launching capability of optical fiber
15A04701.5	Evaluate the power penalties by system considerations in the link, error control corrections and detections
15A04701.6	Infer the impact of WDM in optical communication.

Course name: EMBEDDED SYSTEMS 15A04702 Course year:2020-21

15A04702.1	Understand the concepts of embedded systems, Low power features of various TM4123xx Family advanced microcontrollers
15A04702.2	Illustrate the architectural features of TM4C123xx, on chip peripherals and real time clock, watch dog timer.
15A04702.3	Apply the ADC & PWM concepts to the specific embedded applications
15A04702.4	Evaluate the various serial communication protocols for interfacing external devices.
15A04702.5	Analyze the architecture of IoT and various wireless communication standards to interface with controller.
15A04702.6	Design the Embedded Systems using TM4C123xx, Interfacing devices

Course name: MICROWAVE ENGINEERING 15A04703 Course year:2020-21

15A04703.1	Recall the basic Maxwell's equations and apply to solve the wave equations in rectangular waveguide..
15A04703.2	Infer the concepts of cavity resonators and compute the dominant modes and resonant frequencies.
15A04703.3	Analyze different waveguide components and predict how these components are used in microwave communication
15A04703.4	Relate how an electron beam interacts with the electrostatic field in cavity to generate microwaves in Klystron tubes.
15A04703.5	Comprehend the significance of slow wave structures for amplification in travelling wave tubes and Interpret the applications of microwave solid state devices by describing their operation.

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15A04703.6	Estimate different blocks of microwave bench and describe how parameters like VSWR, Attenuation, Impedance, Power can be measured using bench.

Course name: RADAR SYSTEMS 15A04705 Course year:2020-21

15A04705.1	Analyze the basic concepts of Radar and Radar Equations
15A04705.2	Explain the concepts of CW & FM-CW radar
15A04705.3	Understand the working principal of MTI and Pulse Doppler Radar.
15A04705.4	Describe the operation of Tracking radar and its types
15A04705.5	Evaluate the Detection of Signals in Noise by using filtering concepts
15A04705.6	Summarize the types of displays, duplexers at the radar receivers and infer the basic concepts of antenna parameters.

Course name: DIGITAL IMAGE PROCESSING 15A04708 Course year:2020-21

15A04708.1	Analyze the various mathematical tools employed in the applications of digital image processing.
15A04708.2	Compute the different Image transforms employed in digital image processing
15A04708.3	Understand the various algorithms in spatial and frequency domain employed for the enhancement of image quality.
15A04708.4	Understand the different color models along with the various methods employed for color image processing.
15A04708.5	Evaluate the various mathematical models employed for restoration of degraded images
15A04708.6	Analyze various methods employed for image compression.

Course name: CELLULAR & MOBILE COMMUNICATION15A04709 Course year:2020-21

15A04709.1	Understand cellular mobile system and performance in different environments
15A04709.2	To understand frequency reuse & Co channel interference
15A04709.3	Measure the cell coverage for different areas
15A04709.4	Able to Understand Cell site and different pattern antennas
15A04709.5	Able to analyze the Different frequency managements and sectorization
15A04709.6	Understand the different methods of handoff mechanisms and GSM Architecture

Course name: MICROWAVE & OPTICAL COMMUNICATIONS LABORATORY 15A04711 Course year:2020-21

15A04711.1	Analyze the different components of microwave bench used to measure the different parameters at microwave frequencies like impedance, attenuation, and VSWR
15A04711.2	Generating different modes of klystron tube to analyze interaction of electron beam with electro static filed by changing different repeller voltages.
15A04711.3	Estimate and relate how the microwave energy is coupled from input port of primary waveguide to ports of secondary waveguide.
15A04711.4	Measuring the relation between the LED dc forward current and the LED optical power output by determining the linearity of the device at different wavelengths.

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15A04711.5	Finding the changes in optical power of a laser diode by changing forward current of a laser diode
15A04711.6	Determine the Numerical aperture of the optical fiber and study the various types of losses that occur in optical fiber.

Course name: VLSI & EMBEDDED SYSTEMS LABORATORY 15A04712 Course year:2020-21

15A04712.1	Design and draw the internal structure of the various digital integrated circuits.
15A04712.2	Develop VHDL HDL source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.
15A04712.3	Verify the logical operations of the digital ICs using necessary hardware in the laboratory
15A04712.2	Develop an algorithm, the flow diagram, source code and perform the compilation
15A04712.2	Generate the required binary file which can be dumped into the controller and obtain the respective output control on the connected peripheral
15A04712.2	Verify the logic with the necessary embedded hardware.

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ECE IV-II

Course name: ADVANCED DIGITAL SIGNAL PROCESSING-MULTIRATE & WAVELET 15A04801
Course year:2020-21

15A04801.1	To study about the digital signal processing algorithms and multi rate signal processing
15A04801.2	To study about the power spectral estimation by using Barlett, Welch&Blackmann& Tukey methods.
15A04801.3	The study about the effects of finite word length in fixed-point dspsystems.
15A04801.4	Analyze various methods employed for image compression
15A04801.5	Understand the different color models along with the various methods employed for color image processing.

Course name: LOW POWER VLSI CIRCUITS AND SYSTEMS 15A04802 Course year:2020-21

15A04802.1	Understand the electrical characteristics of MOS transistors and the importance of low power.
15A04802.2	Analyze the characteristics of various inverters and their load driving capabilities.
15A04802.3	Able to design various logic circuits using switch and gate logic.
15A04802.4	Distinguish various sources of power dissipation and implement supply voltage scaling for low power.
15A04802.5	Analyze different approaches to minimize switched capacitances.
15A04802.6	Understand the methods to minimize leakage power and the use CAD tools for low power.

Course name: PROJECT Course year:2020-21

CO.1	Find out the actual problem subject to electronics & communication engineering
CO.2	Study the problem, and define the computing requirements required for its implementation
CO.3	Gain the knowledge and skills to do research in electronics & communication engineering discipline
CO.4	Use programming techniques to implement the project in hardware or software format
CO.5	Communicate effectively while completing the project and delivering the presentation
CO.6	Contribute effectively as a member in team and perform various tasks in completing the project
CO.7	Find out the actual problem subject to electronics & communication engineering

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REGULATION R15

COURSES OUTCOMES

CSE IV-I

Course name: GRID AND CLOUD COMPUTING **Course year:2020-21**

CO1	Apply the security models in the grid and the cloud environment
CO2	Use the grid and cloud tool kits.
CO3	Apply the concept of virtualization.
CO4	Apply grid computing techniques to solve large scale scientific problems
CO5	Demonstrate the ability to design, use, and interpret control charts for variables.
CO6	Demonstrate the knowledge and understand various queuing models

Course name: INFORMATION SECURITY **Course year:2020-21**

CO1	Extensive, thorough and significant understanding of the concepts, issues, principles and theories of computer network security
CO2	Identifying the suitable points for applying security features for network traffic
CO3	Understanding the various cryptographic algorithms and implementation of the same at software level
CO4	Understanding the various attacks, security mechanisms and services
CO5	Protect the network from both internal and external attacks
CO6	Design of new security approaches

Course name: MOBILE APPLICATION DEVELOPMENT **Course year:2020-21**

CO1	To understand fundamentals of android operating systems.
CO2	Illustrate the various components, layouts and views in creating android applications
CO3	To understand fundamentals of android programming
CO4	Create data sharing with different applications and sending and intercepting SMS.
CO5	Develop applications using services and publishing android applications.
CO6	To demonstrate their skills of using Android software development tools

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Course name: SOFTWARE ARCHITECTURE **Course year:2020-21**

CO1	Design and motivate software architecture for large scale software systems
CO2	Recognize major software architectural styles, design patterns, and frameworks
CO3	Describe a software architecture using various documentation approaches and architectural
CO4	description languages
CO5	Generate architectural alternatives for a problem and select among them
CO6	Use well-understood paradigms for designing new systems

Course name: SOFTWARE PROJECT MANAGEMENT **Course year:2020-21**

CO1	Ability to achieve cost effective management for the software project and business software.
CO2	Develop Strategy to achieve the concurrence among stakeholders at every stage in the life cycle known by the student.
CO3	Provided flexible project management software to meet both current and future demands of a business.
CO4	Ability to incorporate organizational culture into business software to build employee and workplace morale.
CO5	Ability to Work within customer budgets.
CO6	Capability to reach company goals and customer strategic objectives in every possible way.

CSE IV-II

Course name: INNOVATIONS&IT MANAGEMENT **Course year:2020-21**

CO1	Understand the rule of information technology in business.
CO2	Understand the future of information systems and the manner in which they are shaping the world around us.
CO3	Understand the rule of information technology in business.
CO4	Abilities to solve business problems by applying analytics.
CO5	Understand the ethical and social issues concerning information systems.
CO6	Ability to use ICT to participate in democratic process.

Course name: CYBER SECURITY **Course year:2020-21**

CO1	Identify different types of attacks on mobile and wireless devices.
CO2	Understand various categories of cyber crime.
CO3	Develop various cyber crime investigation tools.
CO4	Understand about digital forensics
CO5	Evaluate the type of forensics
CO6	Identify the laws and acts related to cyber crime.

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