

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF CIVIL ENGINEERING
COURSE STRUCTURE

I Year – I SEMESTER

R-20 Syllabus for CE, JNTUK w. e. f. 2020-21

S.No	Subjects & Course Code	Course Outcomes
1	Mathematics – I (Calculus & Differential Equations) Bsc1102	<ul style="list-style-type: none"> i. Utilize Mean Value Theorems To Real Life Problems (L3) ii. Solve The Differential Equations Related To Various Engineering Fields (L3) iii. Familiarize With Functions Of Several Variables Which Is Useful In Optimization (L3) iv. Apply Double Integration Techniques In Evaluating Areas Bounded By Region (L3) v. Students Will Also Learn Important Tools Of Calculus In Higher Dimensions. Students Will vi. Become Familiar With 2- Dimensional And 3-Dimensional Coordinate Systems(L5)
2	English Hsmc1101	<ul style="list-style-type: none"> i. Understand Social Or Transactional Dialogues Spoken By Native Speakers Of English And Identify The context, Topic, And Pieces Of Specific Information ii. Ask And Answer General Questions On Familiar Topics And Introduce Oneself/Others iii. Employ Suitable Strategies For Skimming And Scanning To Get The General Idea Of A Text And Locate specific Information iv. Recognize Paragraph Structure And Be Able To Match Beginnings/Endings/Headings With Paragraphs v. Form Sentences Using Proper Grammatical Structures And Correct Word Forms
3	Engineering Physics Bsc1102	<ul style="list-style-type: none"> i. Explain The Need Of Coherent Sources And The Conditions For Sustained Interference (L2) ii. Identify Engineering Applications Of Interference (L3) iii. Analyze The Differences Between Interference And Diffraction With Applications (L4) iv. Illustrate The Concept Of Polarization Of Light And Its Applications (L2) v. Classify Ordinary Polarized Light And Extraordinary Polarized Light (L2)
4	Engineering Drawing Esc1101	<ul style="list-style-type: none"> i. Learn Several Drawings Of Engineering Objects ii. The Student Will Learn How To Visualize 2d & 3d Objects
5	Engineering Geology (Integrated) (Theory & Lab) Esc1102	<ul style="list-style-type: none"> i. Identify And Classify The Geological Minerals Measure The Rock Strengths Of Various Rocks ii. Classify And Measure The Earthquake Prone Areas To Practice The Hazard Zonation Classify, Monitor And Measure The Landslides And Subsidence Prepares, Analyses And Interpret The Engineering Geologic Maps

		<p>Analyses</p> <p>iii. The Ground Conditions Through Geophysical Surveys. Test The Geological Material And Ground To Check The Suitability Of Civil Engineering Project Construction.</p> <p>iv. Investigate The Project Site For Mega/Mini Civil Engineering Projects. Site Selection For Mega Engineering Projects Like Dams, Tunnels, Disposal Sites Etc.,</p> <p>v. Identify Megascopic Minerals & Their Properties.</p> <p>vi. Identify Megascopic Rocks & Their Properties.</p> <p>vii. Identify The Site Parameters Such As Contour, Slope & Aspect</p> <p>viii. For Topography. Know The Occurrence Of Materials Using The Strike & Dip Problems.</p>
6	English Lab Hsmc11 02	-----
7	Engineering Physics Lab Bsc1103	-----
8	Basics Of Civil Engg. Work Shop (Lab) Esc1102	<p>i. Identify Various Components Of A Building And Give Lump-Sum Estimate.</p> <p>ii. Determine Distances And Irregular Areas Using Conventional Survey Instruments Like Chain, Tape, Cross-Staff And Compass Identify Different Soils Know Various Traffic Signs & Signals Determine Centre Of Gravity And Moment Of Inertia Of Channel And I-Sections.</p> <p>iii. Set Out A Signal Room Building As Per Given Plan Install Simple Sanitary Filling And Find Discharge/Velocity In A Water Pipe Line As Density Of Water</p> <p>iv. Know To The Process Of Making Cement Mortar / Concrete For Nominal Mix</p>

Department of Civil Engineering
I year – II semester

1	Linear Algebra And Numerical Methods Mathematics-II	<p>i. Develop The Use Of Matrix Algebra Techniques That Is Needed By Engineers For Practical Applications(L6)</p> <p>ii. Solve System Of Linear Algebraic Equations Using Gauss Elimination, Gauss Jordan, Gauss Seidel(L3)</p> <p>iii. Evaluate The Approximate Roots Of Polynomial And Transcendental Equations By different Algorithms(L5)</p> <p>iv. Apply Newton's Forward & Backward Interpolation And Lagrange's Formulae For Equal And Unequal Intervals (L3)</p> <p>v. Apply Numerical Integral Techniques To Different Engineering Problems (L3)</p> <p>vi. Apply Different Algorithms For Approximating The Solutions Of Ordinary Differential</p> <p>vii. Equations With Initial Conditions To Its Analytical Computations (L3)</p>
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2	Engineering Chemistry	<ul style="list-style-type: none"> i. <i>Analyze</i> The Different Types Of Composite Plastic Materials And <i>Interpret</i> The Mechanism Of Conduction In Conducting Polymers. ii. <i>Synthesize</i> Nanomaterials For Modern Advances Of Engineering Technology. iii. <i>Summarize</i> The Techniques That Detect And Measure Changes Of State Of Reaction. iv. <i>Illustrate</i> The Commonly Used Industrial Materials.
3	Engineering Mechanics	<ul style="list-style-type: none"> 1. The Student Should Be Able To Draw Free Body Diagrams For Particles And Rigid Bodies In Plane And Space And Problems To Solve The Unknown Forces; Orientations And Geometric Parameters. 2. He Should Be Able To Determine Centroid For Lines, Areas And Center Of Gravity For Volumes And Their Composites. 3. He Should Be Able To Determine Area And Mass Movement Of Inertia For Composite Sections i. 4. He Should Be Able To Analyze Motion Of Particles And Rigid Bodies And Apply The principles Of Motion, Work Energy And Impulse – Momentum.
3	Programming For Problem Solving Using C	<ul style="list-style-type: none"> 1) To Write Algorithms And To Draw Flowcharts For Solving Problems 2) To Convert Flowcharts/Algorithms To C Programs, Compile And Debug Programs 3) To Use Different Operators, Data Types And Write Programs That Use Two-Way/ Multi-Way Selection 4) To Select The Best Loop Construct For A Given Problem 5) To Design And Implement Programs To Analyze The Different Pointer Applications 6) To Decompose A Problem Into Functions And To Develop Modular Reusable Code 7) To Apply File I/O Operations
4	Basic Electrical & Electronics Engineering	<ul style="list-style-type: none"> 1) Analyse Various Electrical Networks. 2) Understand Operation Of Dc Generators, 3-Point Starter And Dc Machine Testing By Swinburne's test And Brake Test. 3) Analyse Performance Of single-Phase Transformer And Acquire Proper Knowledge And 4) Working Of 3-Phase Alternator And 3-Phase Induction Motors. 5) Analyse Operation Of Half Wave, Full Wave Bridge Rectifiers And Op-Amps. 6) Understanding Operations of Ce Amplifier and Basic Concept Of Feedback Amplifier.
5	Building Materials And Concrete Technology (Esc1203)	<ul style="list-style-type: none"> 1) Know Various Engineering Properties Of Building Construction Materials And Suggest Their Suitability 2. Identify The Functional Role Of Ingredients Of Concrete And Apply This Knowledge To Concrete Mix Design 3. Acquire And Apply Fundamental Knowledge In The Fresh And Hardened Properties Of Concrete
6	Engineering Chemistry Lab (Bsc1203)	<ul style="list-style-type: none"> i. The Students Entering Into The Professional Course

		<p>Have Practically Very Little Exposure To Lab Classes.</p> <p>ii. The Experiments Introduce Volumetric Analysis; Redox Titrations With Different Indicators; EDTA Titrations; Then They Are Exposed To A Few Instrumental Methods Of Chemical Analysis. Thus At The End Of The Lab Course,</p> <p>iii. The Student Is Exposed To Different Methods Of Chemical Analysis And Use Of Some Commonly Employed Instruments.</p> <p>iv. They Thus Acquire Some Experimental Skills.</p>
7	Building Planning And Computer Aided Engineering Drawing (Esc1205)	<p>i. Perform Basic Commands Of Any Suitable Cad Software To Draw 2d Drawings</p> <p>ii. Interpret The Conventions, Signs And Symbols From A Given Drawing.</p> <p>iii. Prepare Line Plans Of Residential And Public Buildings Using Principles Of Planning.</p> <p>iv. Prepare Submission And Working Drawing From The Given Requirement For Load Bearing And Framed Structures</p>
8	Environmental Science(Mc1201)	<p>i. Overall Understanding Of The Natural Resources.</p> <p>ii. Basic Understanding Of The Ecosystem And Its Diversity.</p> <p>iii. Acquaintance On Various Environmental Challenges Induced Due To Unplanned Anthropogenic Activities.</p> <p>iv. An Understanding Of The Environmental Impact Of Developmental Activities.</p> <p>v. Awareness On The Social Issues, Environmental Legislation And Global Treaties.</p>

**DEPARTMENT OF MECHANICAL ENGINEERING
COURSE STRUCTURE**

I Year – I SEMESTER

R-20 Syllabus for ME, JNTUK w. e. f. 2020-21

Sl. No	Course Components	Subjects	Outcomes
I	HSMC	Communicative English	<p>v. Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information</p> <p>vi. Ask and answer general questions on familiar topics and introduce oneself/others</p> <p>vii. Employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information</p> <p>viii. Recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs</p> <p>ix. Form sentences using proper grammatical structures and correct word forms</p>

2	BSC	Mathematics-I (Calculus and Differential Equations)	<ul style="list-style-type: none"> i. Utilize mean value theorems to real life problems (L3) ii. Solve the differential equations related to various engineering fields (L3) iii. Familiarize with functions of several variables which is useful in optimization (L3) iv. Apply double integration techniques in evaluating areas bounded by region (L3) v. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional and 3-dimensional coordinate systems(L5)
3	BSC	Mathematics-II (Linear Algebra and Numerical Methods)	<ul style="list-style-type: none"> i. Develop the use of matrix algebra techniques that is needed by engineers for practical Applications(16) ii. Solve system of linear algebraic equations using gauss elimination, gauss Jordan, gauss Seidel(13) iii. Evaluate the approximate roots of polynomial and transcendental equations by different algorithms(15) iv. Apply newton's forward & backward interpolation and Lagrange's formulae for equal And unequal intervals (13) v. Apply numerical integral techniques to different engineering problems (13) vi. Apply different algorithms for approximating the solutions of ordinary differential vii. Equations with initial conditions to its analytical computations (13)
4	ESC	Programming for Problem Solving Using C	<ul style="list-style-type: none"> 1) to write algorithms and to draw flowcharts for solving problems 2) to convert flowcharts/algorithms to c programs, compile and debug programs 3) to use different operators, data types and write programs that use two-way/ multi-way selection 4) to select the best loop construct for a given problem 5) to design and implement programs to analyze the different pointer applications 6) to decompose a problem into functions and to develop modular reusable code 7) to apply file i/o operations
5	ESC	Engineering Drawing & Design	<ul style="list-style-type: none"> 1) Learn several drawings of engineering objects 2) The student will learn how to visualize 2D & 3D objects.
6	HSMC	Communicative English Lab	<ul style="list-style-type: none"> 1) <input type="checkbox"/> understand social or transactional dialogues spoken by native speakers of English and Identify the context, topic, and pieces of specific information 2) <input type="checkbox"/> ask and answer general questions on familiar topics and introduce oneself/others 3) <input type="checkbox"/> employ suitable strategies for skimming and scanning to get the general idea of a text And locate specific information 4) <input type="checkbox"/> recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs 5) <input type="checkbox"/> form sentences using proper grammatical structures and correct word forms

7	BSC	Electrical Engineering Workshop	<ol style="list-style-type: none"> 1) Explain the limitations, tolerances, safety aspects of electrical systems and wiring. 2) Select wires/cables and other accessories used in different types of wiring. 3) Make simple lighting and power circuits. 4) Measure current, voltage and power in a circuit.
8	ESC	Programming for Problem Solving Using C Lab	<ol style="list-style-type: none"> 1) To write algorithms and to draw flowcharts for solving problems 2) To convert flowcharts/algorithms to C Programs, compile and debug programs 3) To use different operators, data types and write programs that use two-way/ multi-way selection 4) To select the best loop construct for a given problem 5) To design and implement programs to analyze the different pointer applications 6) To decompose a problem into functions and to develop modular reusable code 7) To apply File I/O operations 8) -----

**R-20 Syllabus for ME, JNTUK w. e. f. 2020-21
I Year – II SEMESTER**

Sl. No	Course Components	Subjects	
1	BSC	Mathematics-III (Vector Calculus, Transforms And PDE)	<ol style="list-style-type: none"> i. Interpret The Physical Meaning Of Different Operators Such As Gradient, Curl And Divergence (L5) ii. Estimate The Work Done Against A Field, Circulation And Flux Using Vector Calculus (L5) iii. Apply The Laplace Transform For Solving Differential Equations (L3) iv. Find Or Compute The Fourier Series Of Periodic Signals (L3) Know And Be Able To Apply Integral Expressions For The Forwards And Inverse Fourier Transform To A Range Of Non-Periodic Waveforms (L3) vi. Identify Solution Methods For Partial Differential Equations That Model Physical Processes (L3)
2	BSC	Applied Physics	<ol style="list-style-type: none"> 1) Explain The Need Of Coherent Sources And The Conditions For Sustained Interference (L2) 2) Identify Engineering Applications Of Interference (L3) 3) Analyze The Differences Between Interference And Diffraction With Applications (L4) 4) Illustrate The Concept Of Polarization Of Light And Its Applications (L2) 5) Classify Ordinary Polarized Light And Extraordinary Polarized Light (L2)

3	ESC	Data Structures Through C	<ul style="list-style-type: none"> i. Data Structures Concepts with Arrays, Stacks, Queues. ii. Linked Lists For Stacks, Queues And For Other Applications. iii. Traversal Methods In The Trees. iv. Various Algorithms Available For The Graphs. v. Sorting And Searching In The Data Ret Retrieval Applications.
4	ESC	Electrical Circuit Analysis -I	<ul style="list-style-type: none"> i. Various electrical networks in presence of active and passive elements. ii. Electrical networks with network topology concepts. iii. Any magnetic circuit with various dot conventions. iv. Any R, L, C network with sinusoidal excitation. v. Any R, L, network with variation of any one of the parameters i.e R, L, C and f. vi. Electrical networks by using principles of network theorems.
5	ESC	Basic Civil and Mechanical Engineering	-----
6	BSC	Applied Physics Lab	<ul style="list-style-type: none"> i. Explain the need of coherent sources and the conditions for sustained interference (L2) ii. Identify engineering applications of interference (L3) iii. Analyze the differences between interference and diffraction with applications (L4) iv. Illustrate the concept of polarization of light and its applications (L2) v. Classify ordinary polarized light and extraordinary polarized light (L2)
7	ESC	Basic Civil and Mechanical Engineering Lab	-----
8	ESC	Data Structures through C Lab	<ul style="list-style-type: none"> i. Be able to design and analyze the time and space efficiency of the data structure. ii. Be capable to identify the appropriate data structure for given problem. iii. Have practical knowledge on the applications of data structures.
9	Mandatory Course	Constitution of India	<ul style="list-style-type: none"> i. Understand the structure of state government ii. Analyze the role Governor and Chief Minister iii. Explain the role of state Secretariat iv. Differentiate between structure and functions of state secretariat

**DEPARTMENT OF EEE ENGINEERING
COURSE STRUCTURE**

I Year – I SEMESTER

R-20 Syllabus for EEE, JNTUK w. e. f. 2020-21

1	Calculus & differential equations-m1	<ul style="list-style-type: none"> i. Utilize mean value theorems to real life problems (13) ii. Solve the differential equations related to various engineering fields (13) iii. Familiarize with functions of several variables which is useful in optimization (13) iv. Apply double integration techniques in evaluating areas bounded by region (13) v. Students will also learn important tools of calculus in higher dimensions. Students will vi. Become familiar with 2- dimensional and 3-dimensional coordinate systems(15)
2	Engineering physics	<ul style="list-style-type: none"> i. Explain the need of coherent sources and the conditions for sustained interference (12) ii. Identify engineering applications of interference (13) iii. Analyze the differences between interference and diffraction with applications (14) iv. Illustrate the concept of polarization of light and its applications (12) v. Classify ordinary polarized light and extraordinary polarized light (12)
3	Programming for Problem Solving	<ul style="list-style-type: none"> i. To write algorithms and to draw flowcharts for solving problems ii. To convert flowcharts/algorithms to C Programs, compile and debug programs iii. To use different operators, data types and write programs that use two-way/ multi-way selection iv. To select the best loop construct for a given problem v. To design and implement programs to analyze the different pointer applications vi. To decompose a problem into functions and to develop modular reusable code vii. To apply File I/O operations
4	English	<ul style="list-style-type: none"> i. Understand Social Or Transactional Dialogues Spoken By Native Speakers Of English And Identify The context, Topic, And Pieces Of Specific Information ii. Ask And Answer General Questions On Familiar Topics And Introduce Oneself/Others iii. Employ Suitable Strategies For Skimming And Scanning To Get The General Idea Of A Text And Locate specific Information iv. Recognize Paragraph Structure And Be Able To Match Beginnings/Endings/Headings With Paragraphs v. Form Sentences Using Proper Grammatical Structures And Correct Word Forms

5	Engineering drawing	<ul style="list-style-type: none"> i. Learn Several Drawings Of Engineering Objects ii. The Student Will Learn How To Visualize 2d & 3d Objects.
6	Engineering physics lab	<ul style="list-style-type: none"> i. Explain the need of coherent sources and the conditions for sustained interference (12) ii. Identify engineering applications of interference (13) iii. Analyze the differences between interference and diffraction with applications (14) iv. Illustrate the concept of polarization of light and its applications (12) v. Classify ordinary polarized light and extraordinary polarized light (12)
7	Programming for Problem Solving Laboratory	<ul style="list-style-type: none"> i.) to write algorithms and to draw flowcharts for solving problems 3) to convert flowcharts/algorithms to c programs, compile and debug programs 4) to use different operators, data types and write programs that use two-way/ multi-way selection 5) to select the best loop construct for a given problem 6) to design and implement programs to analyze the different pointer applications 7) to decompose a problem into functions and to develop modular reusable code 8) to apply file i/o operations
8	English language lab	<ul style="list-style-type: none"> 1) Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information 2) <input type="checkbox"/> ask and answer general questions on familiar topics and introduce oneself/others 3) <input type="checkbox"/> employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information 4) <input type="checkbox"/> recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs 5) <input type="checkbox"/> form sentences using proper grammatical structures and correct word forms
9	Environmental science	<ul style="list-style-type: none"> 1) Overall understanding of the natural resources. 2) Basic understanding of the ecosystem and its diversity. 3) Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities. 4) An understanding of the environmental impact of developmental activities. 5) Awareness on the social issues, environmental legislation and global treaties.

I Year – II SEMESTER EEE

Sl. No	Subjects	Outcomes
1	Linear Algebra & Numerical Methods-M2	<ul style="list-style-type: none"> 1) develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) 2) solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)

		<ol style="list-style-type: none"> 3) evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) 4) apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) 5) apply numerical integral techniques to different Engineering problems (L3) 6) apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
2	Engineering Chemistry	<ol style="list-style-type: none"> 1) <i>Utilize</i> the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and <i>categorize</i> the reasons for corrosion and study methods to control corrosion.
3	Engineering Mechanics	<ol style="list-style-type: none"> 2) The student should be able to draw free body diagrams for FBDs for particles and rigid bodies in plane and space and problems to solve the unknown forces, orientations and geometric parameters. 3) He should be able to determine centroid for lines, areas and center of gravity for volumes and their composites. 4) He should be able to determine area and mass movement of inertia for composite sections
4	Basic Electrical & Electronics Engineering	<ol style="list-style-type: none"> ii. Analyse various electrical networks. iii. Understand operation of DC generators, 3-point starter and DC machine testing by Swinburne's Test and Brake test. iv. Analyse performance of single-phase transformer and acquire proper knowledge and working of 3-phase alternator and 3-phase induction motors. v. Analyse operation of half wave, full wave bridge rectifiers and OP-AMPs. vi. Understanding operations of CE amplifier and basic concept of feedback amplifier.
5	Computer Aided Engineering Drawing	<ol style="list-style-type: none"> vii. Student get exposed on working of sheet metal with help of development of surfaces. viii. Student understands how to know the hidden details of machine components with the help of sections and interpenetrations of solids. ix. Student shall exposed to modeling commands for generating 2D and 3D objects using computer aided drafting tools which are useful to create machine elements for computer aided analysis.
6	Workshop Practice Lab	-----
7	Engineering Chemistry Laboratory	<ol style="list-style-type: none"> 1) The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. 2) They thus acquire some experimental skills.
8	Basic Electrical & Electronics Engineering	<ol style="list-style-type: none"> i. Compute the efficiency of DC shunt machine without actual loading of the machine.

	Lab	<ul style="list-style-type: none"> ii. Estimate the efficiency and regulation at different load conditions and power factors for single phase transformer with OC and SC tests. iii. Analyse the performance characteristics and to determine efficiency of DC shunt motor & 3-Phase induction motor. iv. Pre-determine the regulation of an alternator by synchronous impedance method. v. Control the speed of dc shunt motor using Armature voltage and Field flux control methods. vi. Draw the characteristics of PN junction diode & transistor vii. Determine the ripple factor of half wave & full wave rectifiers.
9	Constitution of India	<ul style="list-style-type: none"> i. Understand historical background of the constitution making and its importance for building a democratic India. ii. Understand the functioning of three wings of the government i.e., executive, legislative and judiciary. iii. Understand the value of the fundamental rights and duties for becoming good citizen of India. iv. Analyze the decentralization of power between central, state and local self-government. v. Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy. vi. Know the sources, features and principles of Indian Constitution. vii. Learn about Union Government, State government and its administration. viii. Get acquainted with Local administration and Panchayati Raj. ix. Be aware of basic concepts and developments of Human Rights. x. Gain knowledge on roles and functioning of Election Commission.

**DEPARTMENT OF ELECTRONICS ENGINEERING
COURSE STRUCTURE**

I Year – I SEMESTER

R-20 Syllabus for ECE, JNTUK w. e. f. 2020-21

Sl. No	Subjects	Outcomes
1	English	<ul style="list-style-type: none"> 1) Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information 2) Ask and answer general questions on familiar topics and introduce oneself/others 3) Employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information 4) Recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs 5) Form sentences using proper grammatical structures and correct word forms
2	Mathematics –I	<ul style="list-style-type: none"> 1) Utilize mean value theorems to real life problems (L3) 2) Solve the differential equations related to various engineering fields (L3) 3) Familiarize with functions of several variables which is useful

		<p>in optimization (L3)</p> <ol style="list-style-type: none"> 4) Apply double integration techniques in evaluating areas bounded by region (L3) 5) Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems(L5)
3	Applied Chemistry	<ol style="list-style-type: none"> 1) <i>Synthesize</i> nanomaterials for modern advances of engineering technology. 2) <i>Summarize the</i> preparation of semiconductors; analyze the applications of liquid crystals and superconductors. 3) <i>Analyze</i> the principles of different analytical instruments and their applications. 4) <i>Design</i> models for energy by different natural sources. 5) <i>Synthesize</i> nanomaterials for modern advances of engineering technology. 6) <i>Summarize the</i> preparation of semiconductors; analyze the applications of liquid crystals and superconductors.
4	Programming for Problem Solving Using C	<ol style="list-style-type: none"> 1) To write algorithms and to draw flowcharts for solving problems 2) To convert flowcharts/algorithms to C Programs, compile and Debug programs 3) To select the best loop construct for a given problem 4) To design and implement programs to analyze the different pointer applications 5) To decompose a problem into functions and to develop modular reusable code 6) To apply file i/O operations.
5	Engineering Drawing	<ol style="list-style-type: none"> 1) The student will learn how to visualize 2D & 3D objects.
6	English Lab	-----
7	Programming for Problem Solving Using C Lab	<ol style="list-style-type: none"> 2) Gains Knowledge on various concepts of a language. 3) Able to draw flowcharts an write algorithms. 4) Able design and development of C problem solving skills. 5) Able to design and develop modular programming skills. 6) Able to trace and debug a program
8	Applied Chemistry Lab	<ol style="list-style-type: none"> 1) The students entering into the professional course have practically very little exposure to lab classes. 2) The Experiments Introduce Volumetric Analysis; Redox Titrations With Different Indicators; EDTA Titrations; Then They Are Exposed To A Few Instrumental Methods Of Chemical Analysis. 3) Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. 4) They acquire some experimental skills.

COURSE STRUCTURE--ECE DEPARTMENT OF ELECTRONICS ENGINEERING

I Year – I SEMESTER , R-20 Syllabus

1	English HS	<ol style="list-style-type: none"> 1) Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information 2) Ask and answer general questions on familiar topics and introduce oneself/others 3) Employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information 4) Recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs 5) Form sentences using proper grammatical structures and correct word forms
2	Mathematics – I (Calculus And Differential Equations) BS	<ol style="list-style-type: none"> 1) Utilize mean value theorems to real life problems (L3) 2) Solve the differential equations related to various engineering fields (L3) 3) Familiarize with functions of several variables which is useful in optimization (L3) 4) Apply double integration techniques in evaluating areas bounded by region (L3) 5) Students will also learn important tools of calculus in higher dimensions. Students will 6) Become familiar with 2- dimensional and 3-dimensional coordinate systems(L5)
3	Applied Physics BS	<ol style="list-style-type: none"> 1) Explain the need of coherent sources and the conditions for sustained interference (L2) 2) Identify engineering applications of interference (L3) 3) Analyze the differences between interference and diffraction with applications (L4) 4) Illustrate the concept of polarization of light and its applications (L2) 5) Classify ordinary polarized light and extraordinary polarized light (L2)
4	Programming for Problem Solving using C ES	<ol style="list-style-type: none"> 1) To write algorithms and to draw flowcharts for solving problems 2) To convert flowcharts/algorithms to C Programs, compile and debug programs 3) To use different operators, data types and write programs that use two-way/ multi-way selection 4) To select the best loop construct for a given problem 5) To design and implement programs to analyze the different pointer applications 6) To decompose a problem into functions and to develop modular reusable code 1) 7) To apply File I/O operations

5	Computer Engineering Workshop ES	<ol style="list-style-type: none"> 2) Assemble and disassemble components of a PC 3) Construct a fully functional virtual machine, Summarize various Linux operating system commands, 4) Recognize characters & extract text from scanned images, Create audio files and podcasts
6	English Language and Communication Skills Lab HS	<ol style="list-style-type: none"> 1) The students entering into the professional course have practically very little exposure to lab classes. 2) The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.
7	Applied Physics Lab BS	-----
8	Programming for Problem Solving using C Lab ES	<ol style="list-style-type: none"> 1) To write algorithms and to draw flowcharts for solving problems 2) To convert flowcharts/algorithms to C Programs, compile and debug programs 3) To use different operators, data types and write programs that use two-way/ multi-way selection 4) To select the best loop construct for a given problem 5) To design and implement programs to analyze the different pointer applications 6) 6) To decompose a problem into functions and to develop modular reusable code

I Year – II SEMESTER for CSE,

R-20 Syllabus

Sl. No	Subjects	
1	Mathematics –I	<ol style="list-style-type: none"> 1) Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) 2) Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) 3) Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) 4) Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) 5) Apply numerical integral techniques to different Engineering problems (L3) 6) Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
2	Applied Physics	<ol style="list-style-type: none"> 1) Explain the need of coherent sources and the conditions for sustained interference (L2) 2) Identify engineering applications of interference (L3) 3) Analyze the differences between interference and diffraction with applications (L4) 4) Illustrate the concept of polarization of light and its applications (L2) 5) Classify ordinary polarized light and extraordinary polarized light (L2)

3	Object Oriented Programming through Java	<ol style="list-style-type: none"> 1) Show competence in the use of the Java programming language in the development of small to medium- sized application programs that demonstrate professionally acceptable coding and performance standard 2) Illustrate the basic principles of the object-oriented programming 3) Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming.
4	Network Analysis	<ol style="list-style-type: none"> 1) Gain the knowledge on basic network elements. 2) Will analyze the RLC circuit's behavior in detailed. 3) Analyze the performance of periodic waveforms. 4) Analyze the filter design concepts in real world applications.
5	Basic Electrical Engineering	<ol style="list-style-type: none"> 5) Able to explain the operation of synchronous machines 6) Capability to understand the operation of various special machines
6	Electronic workshop Lab	-----
7	Basic Electrical Engineering Lab	<ol style="list-style-type: none"> 1) Determine and predetermine the performance of DC machines and transformers. 2) Control the DC shunt machines 3) Compute the performance of 1-phasetransformer.
8	Applied Physics Lab	-----
9	Environmental Science	<ol style="list-style-type: none"> 1) Overall understanding of the natural resources. 2) Basic understanding of the ecosystem and its diversity. 3) Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities. 4) An understanding of the environmental impact of developmental activities. 5) Awareness on the social issues, environmental legislation and global treaties.

SEMESTER I-II
R-20 Syllabus for CSE, JNTUK w. e. f. 2020-21

S. No	Courses	OUTCOMES
1	Mathematics – II (Linear Algebra And Numerical Methods) BS	<ol style="list-style-type: none"> 1) Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) 2) Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) 3) Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) 4) Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) 5) Apply numerical integral techniques to different Engineering problems (L3) 6) Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
2	Applied Chemistry	<ol style="list-style-type: none"> 1) Utilize the theory of construction of electrodes, batteries and fuel cells

	BS	in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.
3	Computer Organization ES	<ol style="list-style-type: none"> 2) Demonstrate an understanding of the design of the functional units of a digital computer system. 3) Relate Postulates of Boolean algebra and minimize combinational functions 4) Recognize and manipulate representations of numbers stored in digital computers 5) Build the logic families and realization of logic gates. 6) Design and analyze combinational and sequential circuits 7) Identify, compare and assess issues related to ISA, memory, control and I/O functions. 8) Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main components 9) Solve elementary problems by assembly language programming
4	Python Programming ES	<ol style="list-style-type: none"> 1) Develop essential programming skills in computer programming concepts like data types, containers 2) Apply the basics of programming in the Python language 3) Solve coding tasks related conditional execution, loops 4) Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming
5	Data Structures ES	<ol style="list-style-type: none"> 1) Summarize the properties, interfaces, and behaviors of basic abstract data types 2) Discuss the computational efficiency of the principal algorithms for sorting & searching 3) Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs 4) Demonstrate different methods for traversing trees
6	Applied Chemistry Lab BS	<ol style="list-style-type: none"> 1) The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. 2) Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. 3) They acquire some experimental skills.
7	Computer Organization Lab ES	<ol style="list-style-type: none"> 1) Understand working of logic families and logic gates. 2) Design and implement Combinational and Sequential logic circuits. 3) Solve elementary problems by assembly language programming 4) Implement assembly language program for given task for 8086 microprocessor.
8	Data Structures Lab ES	<ol style="list-style-type: none"> 1) Use basic data structures such as arrays and linked list. 2) Use various searching and sorting algorithms
9	Environment Science MC	<ol style="list-style-type: none"> 1) Overall understanding of the natural resources. 2) Basic understanding of the ecosystem and its diversity. 3) Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities. 4) An understanding of the environmental impact of developmental activities. 5) Awareness on the social issues, environmental legislation and global treaties.

S.No	Name Of The Subject	Course Outcomes
1	Linear Integrated Circuits And Applications R1931041	<ul style="list-style-type: none"> i. Design circuits using operational amplifiers for various applications. ii. Analyze and design amplifiers and active filters using op-amp. iii. Diagnose and trouble-shoot linear electronic circuits. Understand the gain-bandwidth concept and frequency response of the amplifier configurations. iv. Understand thoroughly the operational amplifiers with linear integrated circuits.
2	Microprocessor And Microcontrollers R1931042	<ul style="list-style-type: none"> i. Understand the architecture of microprocessor/ microcontroller and their operation. ii. Demonstrate programming skills in assembly language for processors and controllers. iii. Analyze various interfacing techniques and apply them for the design of processor/controller based systems.
3	Digital Communications R1931043	<ul style="list-style-type: none"> 1. Determine the performance of different waveform coding techniques for the generation and digital representation of the signals. 2. Determine the probability of error for various digital modulation schemes 3. Analyze different source coding techniques i. 4. Compute and analyze different error control coding schemes for the reliable transmission of digital information over the channel.
4	Electronic Measurements & Instrumentation R1931044	<ul style="list-style-type: none"> i. Select the instrument to be used based on the requirements. ii. understand and analyze different signal generators and analyzers. iii. understand the design of oscilloscopes for different applications.

		iv. design different transducers for measurement of different parameters
5	Linear Integrated Circuits And Applications-Lab R1931045	Learn several drawings of engineering objects The student will learn how to visualize 2d & 3d objects.
6	Digital Communications Lab R1931043	-----
7	Microprocessor And Microcontrollers-Lab R1931047	-----
8	Mini Project With Hardware Development	Will learn to prepare a work plan for major project
9	Essence Of Indian Traditional Knowledge R1931049	<ul style="list-style-type: none"> i. Understand the concept of traditional knowledge and its importance ii. Know the need and importance of protecting traditional knowledge iii. Know the various enactments related to the protection of traditional knowledge iv. Understand the concepts of intellectual property to protect the traditional knowledge
10	Digital System Design Using Hdl R193104b	<ul style="list-style-type: none"> i. Understand the architecture of fp gas, tools used in modeling of digital design ii. Analyze and design basic digital circuits with combinatorial and sequential logic circuits using verilog hdl. iii. Model complex digital systems at several levels of abstractions. iv. Design real time applications such as vending machine and washing machines etc.
11	Information Theory & Coding (Professional	i. Design an application with error-control coding

	Elective 1)	<ul style="list-style-type: none"> ii. Use compression and decompression techniques iii. Perform source coding and channel coding
	Digital System Design Using Hdl (Professional Elective 1)	<ul style="list-style-type: none"> i. Understand the architecture of fp gas, tools used in modeling of digital design ii. Analyze and design basic digital circuits with combinatorial and sequential logic circuits using veriloghdl. iii. Model complex digital systems at several levels of abstractions. iv. Design real time applications such as vending machine and washing machines etc.
	Datastructures And Algorithms (Professional Elective 1)	<ul style="list-style-type: none"> i. Demonstrate analytical comprehension of concepts such as abstract data types ii. Analyze various generic programming techniques, compare various sorting algorithms and perform their efficiency analysis. iii. Demonstrate the ability to analyze, design, apply and use data structures and algorithms to solve engineering problems and evaluate their solutions. iv. Demonstrate the ability of using generic principles for data representation & manipulation with a view for efficiency, maintainability, and code-reuse. □
	Soft Computing Techniques And Python Programming (Professional Elective 1)	<ul style="list-style-type: none"> i. Understand and comprehend the basics of python programming. ii. Demonstrate the principles of structured programming and be able to describe, design, implement, and test structured programs using currently accepted methodology. iii. Explain the use of the built-in data structures list, sets, tuples and dictionary. iv. Make use of functions and its applications. v. Identify real-world applications using oops, files and exception handling provided by python. vi. Formulate and implement a program to solve a real-world problem using GUI and turtle graphics.

		Understand soft computing application
	Simulation & Mathematical Modeling (Professional Elective 1)	<ul style="list-style-type: none"> i. Solve real world problems which cannot be solved strictly by mathematical approaches. ii. Understand the principles within mathematic modeling of materials science. iii. Demonstrate the ability describe the mathematical components in mechanical and thermal analyses. iv. Be able to describe the conditions in numerical code for solving stress loading problems.

III-II ECE

S.No	Name of The Subject	Course Outcomes
1	Wired and Wireless Transmission Devices	<ul style="list-style-type: none"> i. Identify basic antenna parameters. ii. Design and analyze wire antennas, loop antennas, reflector antennas, lens antennas, horn antennas and micro strip antennas iii. Quantify the fields radiated by various types of antennas iv. Design and analyze antenna arrays v. Analyze antenna measurements to assess antenna's performance vi. Identify the characteristics of radio wave propagation
2	VLSI Design	<ul style="list-style-type: none"> i. Demonstrate a clear understanding of CMOS fabrication flow and technology scaling. ii. Apply the design Rules and draw layout of a given logic circuit. iii. Design MOSFET based logic circuit. iv. Design basic building blocks in Analog IC design. v. Analyze the behavior of amplifier circuits with various loads. vi. Design various CMOS logic circuits for design of Combinational logic circuits. vii. Design amplifier circuits using MOS transistors. viii. Design MOSFET based logic circuits using various

		<p>logic styles like static and dynamic CMOS.</p> <p>ix. Analyze the behaviour of static and dynamic logic circuits.</p>
3	Digital Signal Processing	<p>i. Formulate engineering problems in terms of DSP operations</p> <p>ii. Analyze digital signals and systems</p> <p>iii. Analyze discrete time signals in frequency domain</p> <p>iv. Design digital filters and implement with different structures</p> <p>v. Understand the key architectural</p>
4	Professional Elective (PE2) Cellular & Mobile Communication	<p>vi. Identify the limitations of conventional mobile telephone systems; understand the concepts of cellular systems.</p> <p>vii. Understand the frequency management, channel assignment strategies and antennas in cellular systems.</p> <p>viii. Understand the concepts of handoff and architectures of various cellular systems.</p>
5	Open Elective (OE1) Power Electronics	<p>ix. Explain the characteristics of various power semiconductor devices and understand the gate driver circuits.</p> <p>x. Explain the operation of single-phase full wave converters and perform harmonic analysis.</p> <p>xi. Explain the operation of three phase full-wave converters and perform harmonic analysis.</p> <p>xii. Analyze the operation of different types of DC-dc converters.</p> <p>xiii. Explain the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation.</p>
6	Internet of Things	<p>i. Understand internet of Things and its hardware and software components.</p>

		<ul style="list-style-type: none"> ii. Interface I/O devices, sensors & communication modules. iii. Remotely monitor data and control devices. iv. Design real time iot based applications
7	VLSI Lab	<ul style="list-style-type: none"> i. The students will develop Verilog /vhdl source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer
	Digital Signal Processing Lab	<ul style="list-style-type: none"> i. Compute N-point DFT of a given DT sequence. ii. Design and implementation of FIR filters. iii. Design and implementation of IIR filters.
9	Intellectual Property Rights (IPR) & Patents	<ul style="list-style-type: none"> i. IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seek Patents ii. Student get an insight on Copyrights, Patents and Software patents which are instrumental for further advancements advanced Technical and Scientific disciplines iii. Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latest developments

ECE VI--I B.Tech

S.No	Name of The Subject	Course Outcomes
1	Computer Networks R1641042	<ul style="list-style-type: none"> i. Understand OSI and TCP/IP models Analyze MAC layer protocols and LAN technologies ii. Design applications using internet protocols Understand routing and congestion control algorithms iii. Understand how internet works
2		<ul style="list-style-type: none"> i. Choose necessary components required in modern optical communications systems

	Optical Communications R1641044	<ul style="list-style-type: none"> ii. Design and build optical fiber experiments in the laboratory, and learn how to calculate electromagnetic modes in waveguides, the amount of light lost going through an optical system, dispersion of optical fibers. iii. Use different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems. iv. Choose the optical cables for better communication with minimum losses Design, build, and demonstrate optical fiber experiments in the laboratory
3	Electronic Switching Systems r164104b	<ul style="list-style-type: none"> i. Evaluate the time and space parameters of a switched signal ii. Establish the digital signal path in time and space, between two terminals iii. Evaluate the inherent facilities within the system to test some of the SLIC, CODEC and digital switch functions. iv. Investigate the traffic capacity of the system. Evaluate methods of collecting traffic data. Evaluate the method of interconnecting two separate digital switches
4	Embedded Systems r164104d	<ul style="list-style-type: none"> i. Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function. ii. The hardware components required for an embedded system and the design approach of an embedded hardware. iii. The various embedded firmware design approaches on embedded environment. Understand how to integrate hardware and firmware of an embedded system using real time operating system.
5	Digital Image Processing R 1641042	<ul style="list-style-type: none"> i. Defining the digital image, representation of digital image, importance of image resolution, applications in image processing ii. Know the advantages of representation of digital images in transform domain, application of various image transforms. iii. Know how an image can be enhanced by using histogram techniques, filtering techniques etc iv. Understand image degradation, image

		<p>restoration techniques using spatial filters and frequency domain</p> <p>v. Know the detection of point, line and edges in images, edge linking through local processing, global processing.</p> <p>vi. Understand the redundancy in images, various image compression techniques.</p> <p>vii. Know the video technology from analog color TV systems to digital video systems, how video signal is sampled and filtering operations in video processing.</p> <p>viii. Know the general methodologies for 2D motion estimation, various coding used in video processing.</p>
6	Digital Signal Processing Lab R1641048	<p>i. Comprehend the DFT, FFT and IIR filters. To study the modern digital signal processing algorithms and applications.</p> <p>ii. Have an in-depth knowledge of use of digital systems in real time applications</p> <p>iii. Acquire the basics of multi rate digital signal processing and apply the algorithms for wide area of recent applications.</p> <p>iv. Analyze the power spectrum estimation and comprehend the Finite word length effects in fixed point dsp systems.</p>
7	Micro Wave Engineering & Optical Lab R1641047	-----

ECE VI--II B.Tech

S.No	Name of The Subject	Course Outcomes
1	Cellular Mobile Communications	<p>Identify the limitations of conventional mobile telephone systems; understand the concepts of cellular systems.</p> <p>2. Understand the frequency management, channel assignment strategies and antennas in cellular systems.</p>

		3. Understand the concepts of handoff and architectures of various cellular systems
2	Electronic Measurements and Instrumentation	<p>Select the instrument to be used based on the requirements.</p> <ul style="list-style-type: none"> • Understand and analyze different signal generators and analyzers. • Understand the design of oscilloscopes for different applications. • Design different transducers for measurement of different parameters
3	Satellite Communications	<ol style="list-style-type: none"> 1. Understand the concepts, applications and subsystems of Satellite communications. 2. Derive the expression for G/T ratio and to solve some analytical problems on satellite link design. 3. Understand the various types of multiple access techniques and architecture of earth station design. 4. Understand the concepts of GPS and its architecture
6	Wireless Sensors & Networks (Common to ECE & E.Comp.E)	<p>Know about the Wireless systems and Standards (1G/2G/3G systems).</p> <ul style="list-style-type: none"> • Concept and analysis of CDMA-based wireless networks. • Understand the concepts of Multiple-Input Multiple-Output (MIMO). • Understand the modern wireless systems using OFDM. • Analysis of Satellite-Based Wireless systems
	Seminar	-----
	Project	-----

S.No	Name of the Subject	Course Outcomes
1	Vector Calculus, Fourier Transforms and PDE (M-III) R2021011	<ul style="list-style-type: none"> □ interpret the physical meaning of different operators such as gradient, curl and divergence (L5) □ estimate the work done against a field, circulation and flux using vector calculus (L5) □ apply the Laplace transform for solving differential equations (L3) □ find or compute the Fourier series of periodic signals (L3) □ know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) □ identify solution methods for partial differential equations that model physical processes (L3)
2	Mechanics of Solids R2021031	<p>CO1: Model & Analyze the behavior of basic structural members subjected to various loading and support conditions based on principles of equilibrium.</p> <p>CO2: Understand the apply the concept of stress and strain to analyze and design structural members and machine parts under axial, shear and bending loads, moment and torsional moment.</p> <p>CO3: Students will learn all the methods to analyze beams, columns, frames for normal, shear, and torsion stresses and to solve deflection problems in preparation for the design of such structural components. Students are able to analyse beams and draw correct and complete shear and bending moment diagrams forbeams.</p> <p>CO4: Students attain a deeper understanding of the loads, stresses, and strains acting on a structure and their relations in the elastic behavior</p> <p>CO5: Design and analysis of Industrial components like pressure vessels.</p>
3	Fluid Mechanics & Hydraulic Machines R2021032	<p>CO1: The basic concepts of fluid properties.</p> <p>CO2: The mechanics of fluids in static and dynamic conditions.</p> <p>CO3: Boundary layer theory, flow separation and dimensional analysis.</p> <p>CO4: Hydrodynamic forces of jet on vanes in different positions.</p> <p>CO5: Working Principles and performance evaluation of hydraulic pump and turbines.</p>

4	Production Technology R2021033	CO1: Able to design the patterns and core boxes for metal casting processes CO2: Able to design the gating system for different metallic components CO3: Know the different types of manufacturing processes CO4: Be able to use forging, extrusion processes CO5: Learn about the different types of welding processes used for special fabrication.
5	Kinematics of Machinery R2021034	Contrive a mechanism for a given plane motion with single degree of freedom. Suggest and analyze a mechanism for a given straight line motion and automobile steering motion. Analyze the motion (velocity and acceleration) of a plane mechanism. Suggest and analyze mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc. Select a power transmission system for a given application and analyze motion of different transmission systems
6	Computer Aided Engineering Drawing Practice R2021035	1. Student get exposed on working of sheet metal with help of development of surfaces. 2. Student understands how to know the hidden details of machine components with the help of sections and interpenetrations of solids. 3. Student shall be exposed to modeling commands for generating 2D and 3D objects using computer aided drafting tools which are useful to create machine elements for computer aided analysis.
7	Fluid Mechanics & Hydraulic Machines Lab R2021036	Students be able to practically understand working of Hydraulic Machines like turbines, pumps. Understand impact of jet, venturi meter, orifice meter
8	Production Technology Lab R2021037	Hands-on practical exposure on manufacturing processes and equipment like pattern making, molding, and welding processes.
9	Drafting and Modeling Lab R2021038	Apply CATIA software to prepare 2-D and 3-D models

10	Essence of Indian Traditional Knowledge R2021039	<ul style="list-style-type: none"> – Understand the concept of Traditional knowledge and its importance – Know the need and importance of protecting traditional knowledge – Know the various enactments related to the protection of traditional knowledge – Understand the concepts of Intellectual property to protect the traditional knowledge
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II B.Tech II - Sem

Regulation: R20

1	Material Science & Metallurgy R2022012	<p>CO1: Understand the crystalline structure of different metals and study the stability of phases in different alloy systems.</p> <p>CO2: Study the behavior of ferrous and non ferrous metals and alloys and their application in different domains</p> <p>CO3: Able to understand the effect of heat treatment, addition of alloying elements on properties of ferrous metals.</p> <p>CO4: Grasp the methods of making of metal powders and applications of powder metallurgy</p> <p>CO5: Comprehend the properties and applications of ceramic, composites and other advanced methods.</p>
2	Complex Variables and Statistical Methods R2022011	<ul style="list-style-type: none"> • apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3) • find the differentiation and integration of complex functions used in engineering problems (L5) • make use of the Cauchy residue theorem to evaluate certain integrals (L3) • apply discrete and continuous probability distributions (L3) • design the components of a classical hypothesis test (L6) • infer the statistical inferential methods based on small and large sampling tests (L4)

3	Dynamics of Machinery R2022032	<ol style="list-style-type: none"> 1. To compute the frictional losses and transmission in clutches, brakes and dynamometers 2. To determine the effect of gyroscopic couple in motor vehicles, ships and aeroplanes 3. To analyze the forces in four bar and slider crank mechanisms and design a flywheel 4. To determine the rotary unbalanced mass in reciprocating equipment 5. To determine the unbalanced forces and couples in reciprocating and radial engines 6. To determine the natural frequencies of discrete systems undergoing longitudinal, torsional and transverse vibrations.
4	Thermal Engineering-I R2022033	CO1: Derive the actual cycle from fuel-air cycle and air-standard cycle for all practical applications. CO2: Explain working principle and various components of IC engine CO3: Explain combustion phenomenon of CI and SI engines and their impact on engine variables. CO4: Analyze the performance of an IC engine based on the performance parameters. CO5: Explain the cycles and systems of a gas turbine and determine the efficiency of gas turbine. CO6: Explain the applications and working principle of rockets and jet propulsion.
5	Industrial Engineering and Management R2022034	<ol style="list-style-type: none"> 1. Design and conduct experiments, analyse, interpret data and synthesize valid conclusions 2. Design a system, component, or process, and synthesize solutions to achieve desired needs 3. Use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, and environmental constraints 4. Function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management
6	Mechanics of Solids and Metallurgy Lab R2022035	Practical exposure on the microstructures of various materials and their hardness evaluation. Also Practical knowledge on the evaluation of material properties through various destructive testing procedures.

7	Machine Drawing Practice R2022036	CO1. Draw and represent standard dimensions of different mechanical fasteners and joints and Couplings. CO2. Draw different types of bearings showing different components. CO3. Assemble components of a machine part and draw the sectional assembly drawing showing the dimensions of all the components of the assembly as per bill of materials CO4. Select and represent fits and geometrical form of different mating parts in assembly drawings. CO5: To prepare manufacturing drawings indicating fits, tolerances, surface finish and surface treatment requirements.
8	Theory of Machines Lab R2022037	The student be able to understand practical working of a) Governors 2) Flywheels 3) Spring Mass system 4) Screw-jack and gears
9	Python Programming Lab R2022038	Able to apply python programming skills to solve problems in the field of engineering

III B.Tech I - Sem

Regulation: R19

1	Dynamics of Machinery R1931031	(1) To compute the frictional losses and transmission in clutches, brakes and dynamometers (2) To determine the effect of gyroscopic couple in motor vehicles, ships and aeroplanes (3) To analyze the forces in four bar and slider crank mechanisms and design a flywheel (4) To determine the rotary unbalanced mass in reciprocating equipment (5) To determine the unbalanced forces and couples in reciprocating and radial engines (6) To determine the natural frequencies of discrete systems undergoing longitudinal, torsional and transverse vibrations.
2	Design of Machine Members-II R1931032	1. Select the suitable bearing based on the application of the loads and predict the life of the bearing. 2. Design of IC Engines parts. 3. Design of power transmission elements such as gears, belts, chains, pulleys, ropes, levers and

		<p>power screws.</p> <p>4. Design spur & helical gear for different engineering applications.</p>
3	<p>Mechanical Measurements & Metrology</p> <p>R1931038</p>	<p>CO1: Describe the construction and working principles of measuring instruments for measurement of displacement and speed and select appropriate instrument for a given application.</p> <p>CO2: Describe the construction and working principles of measuring instruments for strain, force, Torque, power, acceleration and Vibration and select appropriate instrument for a given application.</p> <p>CO3: Explain shaft basis system and hole basis systems for fits and represent tolerances for a given fit as per the shaft basis system and hole basis system and design limit gauges based on the tolerances for quality check in mass production.</p> <p>CO4: Explain methods for linear, angle and flatness measurements and select a suitable method and its relevant instrument for a given application.</p> <p>CO5: To measure the threads, gear tooth profiles, surface roughness and flatness using appropriate instruments and analyze the data.</p>
4	<p>Managerial Economics and Financial Accountancy</p> <p>R1931034</p>	<p>The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.</p> <p>The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.</p> <p>The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.</p> <p>The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.</p>
5	<p>IC Engines & Gas turbines</p> <p>R1931035</p>	<p>The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.</p>
6	<p>Thermal Engineering Lab</p> <p>R1931036</p>	<p>The student be able to understand practical working of a) IC Engines 2) Compressors 3) Fuel characteristics 4) Valve and Port working principles</p>

7	Theory of Machines Lab R1931037	The student be able to understand practical working of a) Governors 2) Flywheels 3) Spring Mass system 4) Screw-jack and gears
8	Mechanical Measurements & Metrology Lab R1931038	Student will become familiar with the different instruments that are available for linear, angular, roundness and roughness measurements they will be able to select and use the appropriate measuring instrument according to a specific requirement (in terms of accuracy, etc) Students will be able to select proper measuring instrument and know requirement of calibration, errors in measurement etc. They can perform accurate measurements.
9	Socially Relevant Project R1931039	Apply Engineering skills to solve practical problems in our current society

III B.Tech II - Sem

Regulation: R19

1	Operations Research	<ol style="list-style-type: none"> 1. Formulate the resource management problems and identify appropriate methods to solve them 2. Apply LPP, transportation and assignment models to optimize the industrial resources 3. Solve decision theory problems through the application of game theory 4. Apply the replacement and queuing models to increase the efficiency of the system 5. Model the project management problems through CPM and PERT
2	Heat Transfer R1632034	<p>CO1: Compute rate of heat transfer for 1D, steady state composite systems without heat generation.</p> <p>CO2: Analyze the system with heat generation, variable thermal conductivity, fins and 1D transient conduction heat transfer problems.</p> <p>CO3: Develop the empirical equations for forced convection problems by using Buckingham's pi theorem.</p> <p>CO4: Compute the rate of heat transfer for natural convection systems and design and analysis of heat exchangers.</p> <p>CO5: Solve the heat transfer systems with phase change and</p>

		radiation.
3	CAD/CAM R1641032	<ol style="list-style-type: none"> 1. Describe the mathematical basis in the technique of representation of geometric entities including points, lines, and parametric curves, surfaces and solid, and the technique of transformation of geometric entities using transformation matrix 2. Describe the use of GT and CAPP for the product development 3. Identify the various elements and their activities in the Computer Integrated Manufacturing Systems.
4	Refrigeration & Air Conditioning R1632033	<ul style="list-style-type: none"> <input type="checkbox"/> Differentiate between different types of refrigeration systems with respect to engineering applications <input type="checkbox"/> Thermodynamically analyse refrigeration and air conditioning systems and evaluate performance parameters <input type="checkbox"/> Apply the principles of Psychrometrics to design the air conditioning loads for the industrial applications <input type="checkbox"/> perform cooling load calculations and select the appropriate process and equipment for the required comfort and industrial air-conditioning.
5	Mechatronics R1641031	<p>CO1. Shall be able to use the various mechatronics systems devices and components in the design of electro mechanical systems.</p> <p>CO1: Explain mechatronics design process and outline appropriate sensors and actuators for engineering applications</p> <p>CO2: Develop a simulation model for simple physical systems</p> <p>CO3: Write simple microcontroller programs</p> <p>CO4: Explain linearization of nonlinear systems and elements of data acquisition</p> <p>CO5: Explain various applications of design of mechatronic systems</p>
6	Simulation of Mechanical Systems Lab	Able to use Matlab to simulate mechanical systems like spring mass system, steering mechanism, linkage mechanism
7	Heat Transfer Lab	The student should be able to evaluate the amount of heat exchange for plane, cylindrical & spherical geometries and should be able to compare the performance of extended surfaces and heat exchangers

8	CAD /CAM Lab R1641037	<ol style="list-style-type: none"> 1. The student will be able to appreciate the utility of the modeling tools in creating 2D and 3D drawings. 2. Use of these tools for any engineering and real time applications 3. Acquire knowledge on utilizing these tools for a better project in their curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their Employment
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IV B.Tech I - Sem

Regulation: R16

1	Mechatronics R1641031	the student shall be able to use the various mechatronics systems devices and components in the design of electro mechanical systems.
2	CAD/CAM R1641032	<ol style="list-style-type: none"> 1. Describe the mathematical basis in the technique of representation of geometric entities including points, lines, and parametric curves, surfaces and solid, and the technique of transformation of geometric entities using transformation matrix 2. Describe the use of GT and CAPP for the product development 3. Identify the various elements and their activities in the Computer Integrated Manufacturing Systems.
3	Finite Element Methods R1641033	<ol style="list-style-type: none"> 1. Understand the concepts behind variational methods and weighted residual methods in FEM 2. Identify the application and characteristics of FEA elements such as bars, beams, plane and isoparametric elements, and 3-D element . 3. Develop element characteristic equation procedure and generation of global stiffness equation will be applied. 4. Able to apply Suitable boundary conditions to a global structural equation, and reduce it to a solvable form. 5. Able to identify how the finite element method expands beyond the structural domain, for problems involving dynamics, heat transfer, and fluid flow.
4	Power Plant Engineering R1641034	Student can understand various conventional methods of power generation and principle of operation and performance of respective prime movers along with their economics and their impact on environment.

5	Additive Manufacturing R164103C	The student shall be able to identify the use of Rapid Prototyping Techniques in the manufacturing of complex components that are otherwise very difficult to manufacture.
6	Advanced Materials R164103D	Student will be able to understand composite material mechanics, reinforcements, manufacturing methods and nano materials
7	CAD/CAM Lab R1641037	<ol style="list-style-type: none"> 1. The student will be able to appreciate the utility of the tools like ANSYS or FLUENT in solving real time problems and day to day problems. 2. Use of these tools for any engineering and real time applications 3. Acquire knowledge on utilizing these tools for a better project in their curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their Employment
8	Mechatronics Lab R1641038	Students will understand PLC Programming, Automation Studio software, MATLAB Programming.

IV B.Tech II - Sem

Regulation: R16

1	Production Planning and Control R1642031	<ol style="list-style-type: none"> 1. Understand the concepts of production and service systems; 2. The ability to apply principles and techniques in the design, planning and control of these systems to optimise/make best use of resources in achieving their objectives. 3. Identify different strategies employed in manufacturing and service industries to plan production and control inventory. 4. Learn measurement of the effectiveness, identify likely areas for improvement, develop and implement improved planning and control methods for production systems.
2	Unconventional Machining Processes R1642032	After completion of course, the student shall understand the principle of working, mechanism of metal removal in the various unconventional machining process. The student is able to identify the process parameters, their effect and applications of different processes.

3	Automobile Engineering R1642033	The student after undergoing the course, shall visualize the layout of an automobile and its systems like transmission, steering, suspension, braking, safety etc and should know the vehicle troubleshooting.
4	Non Destructive Evaluation R164203B	1. Comprehensive, theory based understanding of the techniques and methods of non destructive testing 2. Apply methods knowledge of non destructive testing to evaluate products of railways, automobiles, aircrafts, chemical industries etc.
5	Seminar R1642045	Improved communication skills and body language
6	Project R1642046	Students will be able to practically apply knowledge of Mechanical engineering subjects

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
EEE

II B.Tech I Sem EEE

R20

S.No	Name of The Subject	Course Outcomes
1	Electronic Devices And Circuits	<ul style="list-style-type: none"> Understand The Basic Concepts Of Semiconductor Physics. Understand The Formation Of P-N Junction And How It Can Be Used As A P-N Junction As Diode In Different Modes Of Operation. Know The Construction, Working Principle Of Rectifiers With And Without Filters With Relevant Expressions And Necessary Comparisons. Understand The Construction, Principle Of Operation Of Transistors, BJT And FET With Their V-I Characteristics In Different Configurations. Know The Need Of Transistor Biasing, Various Biasing Techniques For BJT And FET And Stabilization Concepts With Necessary Expressions. Perform The Analysis Of Small Signal Low Frequency Transistor Amplifier Circuits Using BJT And FET In Different Configurations
2	Electrical Circuit Analysis - Ii	<ul style="list-style-type: none"> Understand The Concepts Of Balanced .And Unbalanced Three-Phase Circuits. Know The Transient Behavior Of Electrical Networks With DC Excitations. Learn The Transient Behavior Of Electrical Networks With AC Excitations. Estimate Various Parameters Of A Two Port Network. Understand The Significance Of Filters In Electrical Networks
3	DC Machines And Transformers	<ul style="list-style-type: none"> Assimilate The Concepts Of Electromechanical Energy Conversion. Mitigate The Ill-Effects Of Armature Reaction And Improve Commutation In Dc Machines. Understand The Torque Production Mechanism And Control The Speed Of Dc Motors. Analyze The Performance Of Single Phase Transformers. Predetermine Regulation, Losses And Efficiency Of Single Phase Transformers. Parallel Transformers, Control Voltages With Tap Changing Methods And Achieve Three-Phase To Two-Phase Transformation.
4	Electro Magnetic Fields	<ul style="list-style-type: none"> Compute Electric Fields And Potentials Using Gauss Law Or Solve Laplace's Or Poisson's Equations For Various Electric Charge Distributions. Calculate The Capacitance And Energy Stored In Dielectrics. Calculate The Magnetic Field Intensity Due To Current Carrying Conductor And Understanding The Application Of Ampere's Law, Maxwell's Second And Third Law. Estimate Self And Mutual Inductances And The Energy Stored In The Magnetic Field. Understand The Concepts Of Displacement Current And Poynting Theorem And Poynting

		Vector
5	Electrical Circuits Lab	Apply Various Theorems Determination Of Self And Mutual Inductances Two Port Parameters Of A Given Electric Circuits Draw Locus Diagrams Draw Waveforms And Phasor Diagrams For Lagging And Leading Networks
6	Dc Machines And Transformers Lab	Determine And Predetermine The Performance Of DC Machines And Transformers. Control The Speed Of DC Motor. Obtain Three Phase To Two Phase Transformation.
7	Electronic Devices And Circuits Lab	□□ Analyze The Characteristics Of Diodes, Transistors And Other Devices Design And Implement The Rectifier Circuits, SCR And UJT In The Hardware Circuits. Design The Biasing And Amplifiers Of BJT And FET Amplifiers Measure Electrical Quantities Using CRO In The Experimentation.

II B.Tech II Sem

EEE

R20

S.No	Name Of The Subject	Course Outcomes
1	Python Programming	Develop Essential Programming Skills In Computer Programming- Concepts Like Data Types, Containers Apply The Basics Of Programming In The Python Language Solve Coding Tasks Related Conditional Execution, Loops Solve Coding Tasks Related To The Fundamental Notions And Techniques Used In Object- Oriented Programming
2	Digital Electronics	Classify Different Number Systems And Apply To Generate Various Codes. Use The Concept Of Boolean Algebra In Minimization Of Switching Functions Design Different Types Of Combinational Logic Circuits. Apply Knowledge Of Flip-Flops In Designing Of Registers And Counters The Operation And Design Methodology For Synchronous Sequential Circuits And Algorithmic State Machines.
3	Power Systems - I	Identify The Different Components Of Thermal Power Plants. Identify The Different Components Of Nuclear Power Plants. Identify The Different Components Of Air And Gas Insulated Substations. Identify Single Core And Three Core Cables With Different Insulating Materials. Analyse The Different Economic Factors Of Power Generation And Tariffs.
4	Induction And Synchronous Machines	Explain The Operation And Performance Of Three Phase Induction Motor. Analyze The Torque-Speed Relation, Performance Of Induction Motor And Induction Generator. Implement The Starting Of Single Phase Induction Motors. Develop Winding Design And Predetermine The Regulation Of Synchronous Generators. Explain Hunting Phenomenon, Implement Methods Of Starting And Correction Of Power Factor With Synchronous Motor.
5	Induction And Synchronous Machines Lab	Assess The Performance Of Single Phase And Three Phase Induction Motors. Control The Speed Of Three Phase Induction Motor. Predetermine The Regulation Of Three-Phase Alternator By Various Methods. Find The X_d/X_q ratio Of Alternator And Asses The Performance Of Three-Phase Synchronous Motor.

		Determine The Performance Of Single Phase AC Series Motor.
	Digital Electronics Lab	Learn The Basics Of Gates, Flip-Flops And Counters. Construct Basic Combinational Circuits And Verify Their Functionalities Apply The Design Procedures To Design Basic Sequential Circuits To Understand The Basic Digital Circuits And To Verify Their Operation Apply Boolean Laws To Simplify The Digital Circuits.

S.No	Name Of The Subject	Course Outcomes
1	Design & Drawing Of Reinforced Concrete Structures	Work On Different Types Of Design Methods Carryout Analysis And Design Of Flexural Members And detailing Design Structures Subjected To Shear, Bond And torsion Design Different Type Of Compression Members And footings
2	Water Resources Engineering – II	Be Able To Estimate Irrigation Water Requirements Ability To Design Irrigation Canals And Canal Network Plan An Irrigation System Design Irrigation Canal Structures Plan And Design Diversion Head Works Analyse Stability Of Gravity And Earth Dams Design Ogee Spillways And Energy Dissipation Works
3	Geotechnical Engineering - I	The Student Must Know The Definition Of The Various Quantities Related To Soil Mechanics And Establish Their Inter-Relationships. B. The Student Should Be Able To Know The Methods Of Determination Of The Various Index Properties Of The Soils And Classify The Soils. C. The Student Should Be Able To Know The Importance Of The Different Engineering Properties Of The Soil Such As Compaction, Permeability, Consolidation And Shear Strength And Determine Them In The Laboratory. D. The Student Should Be Able To Apply The Above Concepts In Day-To-Day Civil Engineering Practice.
4	Managerial Economics And Financial Analysis	The Learner Is Equipped With The Knowledge Of Estimating The Demand And Demand Elasticities For A Product. The Knowledge Of Understanding Of The Input-Output-Cost Relationships And Estimation Of The Least Cost Combination Of Inputs. The Pupil Is Also Ready To Understand The Nature Of Different Markets And Price Output Determination Under Various Market Conditions And Also To Have The Knowledge Of Different Business Units. The Learner Is Able To Prepare Financial Statements And The Usage Of Various Accounting Tools For Analysis. The Learner Can Able To Evaluate Various Investment Project Proposals With The Help Of Capital Budgeting Techniques For Decision Making.
5	Program Elective – II A).Pre-Stressed Concrete	At The End Of This Course The Student Will Be Able To Understand Different Methods Of Prestressing Estimate Effective Prestress Including Short And Long Term losses Analyze And Design Prestressed Concrete Beams Under Flexure And shear Understand The Relevant IS Code Provisions For Prestressed Concrete
6	Program Elective – Ib). Watershed Management	Calculate Watershed Parameters And Analyse Watershed Characteristics To Take Appropriate Management Action. Quantify Soil Erosion And Design Control Measures. Apply Land Grading Techniques For Proper Land Management . Suggest Suitable Harvesting Techniques For Better Watershed Management. Apply Appropriate Models For Watershed Management

7	Program Elective –Iic). Advanced Foundation Engineering	<p>Compute The Safe Bearing Capacity Of Footings Subjected To Vertical And Inclined Loads.</p> <p>B. Understand The Advanced Methods Of Settlement Computations And Proportion Foundation Footings.</p> <p>C. Appreciate The Methods Of Computing The Pull-Out Capacity And Negative Skin Friction Of Piles And Compute The Settlements Of Pile Groups In Clays.</p> <p>D. Appreciate The Problems Posed By Expansive Soils And The Different Foundation Practices Devised.</p> <p>E. Appreciate The Difference Between Isolated Footings And Combined Footings And Mat Foundations.</p>
8	Environmental Engineering Lab	<p>Draw Some Conclusion And Decide Whether The Water Is Suitable For Drinking/Construction / Agriculture/ Industry.</p> <p>Estimate Chloride, EC And Salinity Of Soil And Suggest Their Suitability For Construction/Agriculture</p> <p>Estimation Of The Strength Of The Sewage In Terms Of BOD And COD And Decide Whether The Water Body Is Polluted Or Not With Reference To The Stated Parameters In The List Of Experiments</p> <p>Demonstration Of Various Instruments Used In Testing Of Water And Soil And Study Of Drinking Water Standards, WHO Guidelines, Effluent Standards And Standards For Construction/ Agriculture/ Industry.</p>
9	CAD LAB	<p>Model The Geometry Of Real-World Structure Represent The Physical Model Of Structural Element/Structure</p> <p>B) Perform Analysis</p> <p>C) Interpret From The Post Processing Results</p> <p>D) Design The Structural Elements And A System As Per IS Codes</p>
10	PROGRAM ELECTIVE – II D). Urban Transportation Planning	<p>Estimate Travel Demand For An Urban Area</p> <p>B. Plan The Transportation Network For A City</p> <p>C. Identify The Corridor And Plan For Providing Good Transportation Facilities.</p> <p>D. Evaluate Various Alternative Transportation Proposals</p>
11	PROGRAM ELECTIVE – II E). Architecture And Town Planning	<p>The Student Should Be Able To Distinguish Architectural Styles Of Eastern And Western World.</p> <p>B. The Student Should Understand The Importance Of Orders Of Architecture.</p> <p>C. Should Be Able To Compose Spaces Of Buildings Using Design Concepts, Planning Principles.</p> <p>D. Should Understand The Town Planning Standards, Landscaping Features And Regulations Controlling Expansion Of The Towns And The Cities.</p>
12	Socially Relevant Project	<p>The Student(S) Are Be Able To Provide A Solutions The Technological Problems Of Society</p> <p>The Student(S) Is Able Suggest Technological Changes Which Suits Current Needs Of Society</p> <p>The Student(S) Are Able To Explain New Technologies Available For Problems Of The Society.</p> <p>Reference:</p> <p>Web Link: Http://iitk.Ac.In/New/Socially-Relevant-Research</p> <p>Https://Csie.Iitm.Ac.In/Socialprojectsiitm.Html</p> <p>(3) Http://Www.Iitkgp.Ac.In/Files/Csr/Csr_Education.Pdf</p>

S.No	Name Of The Subject	Course Outcomes
1	Power Systems - II R1931021	<p>Understand Parameters Of Various Types Of Transmission Lines During Different Operating Conditions.</p> <p>Understand The Performance Of Short And Medium Transmission Lines.</p> <p>Understand Travelling Waves On Transmission Lines.</p> <p>Understand Various Factors Related To Charged Transmission Lines.</p> <p>Understand Sag/Tension Of Transmission Lines And Performance Of Line Insulators.</p>
2	Power Electronics R1931022	<p>Explain The Characteristics Of Various Power Semiconductor Devices And Analyze The Static And Dynamic Characteristics Of SCR's.</p> <p>Design Firing Circuits For SCR.</p> <p>Explain The Operation Of Single Phase Full-Wave Converters And Analyze Harmonics In The Input Current.</p> <p>Explain The Operation Of Three Phase Full-Wave Converters.</p> <p>Analyze The Operation Of Different Types Of DC-DC Converters.</p> <p>Explain The Operation Of Inverters And Application Of PWM Techniques For Voltage Control And Harmonic Mitigation.</p> <p>Analyze The Operation Of AC-AC Regulators.</p>
3	Linear IC Applications R1931023	<p>Design Circuits Using Operational Amplifiers For Various Applications.</p> <p>Analyze And Design Amplifiers And Active Filters Using Op-Amp.</p> <p>Diagnose And Trouble-Shoot Linear Electronic Circuits.</p> <p>Understand The Gain-Bandwidth Concept And Frequency Response Of The Amplifier Configurations.</p> <p>Understand Thoroughly The Operational Amplifiers With Linear Integrated Circuits.</p>
4	Digital Signal Processing R1931024	<p>Understand The Concepts Of Signal Processing & Transforms.</p> <p>Appraise The Fast Fourier Algorithm.</p> <p>Design FIR And IIR Filters.</p> <p>Appreciate The Concepts Of Multirate Signal Processing.</p>
5	Microprocessors And Microcontrollers R1931025	<p>Understand The Microprocessor Capability In General And Explore The Evaluation Of Microprocessors.</p> <p>Understand The Addressing Modes Of Microprocessors</p> <p>Understand The Microcontroller Capability</p> <p>Program Microprocessors And Microcontrollers.</p> <p>Interface Microprocessors And Microcontrollers With Other Electronic Devices</p> <p>Develop Cyber Physical Systems</p>
6	Electrical Machines-II	

	Laboratory R1931026	Analyze The Performance And Working Magnetic Amplifier, D.C And A.C. Servo Motors And Synchros. Design P,PI,PD And PID Controllers Design Lag, Lead And Lag-Lead Compensators Control The Temperature Using PID Controller Determine The Transfer Function Of D.C Motor Control The Performance Of D.C And A.C Servo Motor. Test The Controllability And Observability. Judge The Stability In Time And Frequency Domain.
7	Electrical Measurements & Instrumentation Laboratory R1931028	The Student(S) Are Be Able To Provide A Solutions The Technological Problems Of Society The Student(S) Is Able Suggest Technological Changes Which Suits Current Needs Of Society The Student(S) Are Able To Explain New Technologies Available For Problems Of The Society. Reference: Web Link: http://iitk.ac.in/new/socially-relevant-research https://csie.iitm.ac.in/socialprojectsiitm.html (3) http://www.iitkgp.ac.in/files/csr/csr_education.pdf
8	Socially Relevant Projects R1931029	The Student(S) Are Be Able To Provide A Solutions The Technological Problems Of Society (1) The Student(S) Is Able Suggest Technological Changes Which Suits Current Needs Of Society (2) The Student(S) Are Able To Explain New Technologies Available For Problems Of The Society. Reference: (1) Web Link: http://iitk.ac.in/new/socially-relevant-research (2) https://csie.iitm.ac.in/socialprojectsiitm.html (3) http://www.iitkgp.ac.in/files/csr/csr_education.pdf
	Control Systems Laboratory R1931027	Analyze The Performance And Working Magnetic Amplifier, D.C And A.C. Servo Motors and Synchros. <ul style="list-style-type: none"> • Design P,PI,PD And PID Controllers • Design Lag, Lead And Lag-Lead Compensators • Control The Temperature Using PID Controller • Determine The Transfer Function Of D.C Motor • Control The Performance Of D.C And A.C Servo Motor. • Test The Controllability And Observability. • Judge The Stability In Time And Frequency Domain.

III B.Tech II Sem EEE

R19

S.No	Name Of The Subject	Course Outcomes
1	Electric Drives	Explain The Fundamentals Of Electric Drive And Different Electric Braking Methods. Analyze The Operation Of Three Phase Converter Fed Dc Motors And Four Quadrant Operations Of Dc Motors Using Dual Converters. Describe The Converter Control Of Dc Motors In Various Quadrants Of Operation Know The Concept Of Speed Control Of Induction Motor By Using AC Voltage Controllers And Voltage Source

		<p>Inverters. Differentiate The Stator Side Control And Rotor Side Control Of Three Phase Induction Motor, Explain The Speed Control Mechanism Of Synchronous Motors.</p>
2	Power System Analysis	<p>Draw Impedance Diagram For A Power System Network And To Understand Per Unit Quantities. Form Y_{bus} and Z_{bus} for A Power System Networks. Understand The Load Flow Solution Of A Power System Using Different Methods. Find The Fault Currents For All Types Faults To Provide Data For The Design Of Protective Devices. Find The Sequence Components Of Currents For Unbalanced Power System Network. Analyze The Steady State, Transient And Dynamic Stability Concepts Of A Power System.</p>
3	Data Structures	<p>□□ Various Algorithms Available For The Graphs. Sorting And Searching In The Data Ret Retrieval Applications.</p>
4	Digital Control Systems	<p>Learn The Advantages Of Discrete Time Control Systems And The “Know How” Of Various Associated Accessories. Understand Z-Transformations And Their Role In The Mathematical Analysis Of Different Systems(Like Laplace Transforms In Analog Systems). Learn The Stability Criterion For Digital Systems And Methods Adopted For Testing The Same Are Explained. Understand The Conventional And State Space Methods Of Design Are Also Introduced.</p>
5	Elective - I Digital IC Applications	<p>Understand The Structure Of Commercially Available Digital Integrated Circuit Families. Learn The IEEE Standard 1076 Hardware Description Language (VHDL). Model Complex Digital Systems At Several Levels Of Abstractions, Behavioral, Structural, Simulation, Synthesis And Rapid System Prototyping. Analyze And Design Basic Digital Circuits With Combinatorial And Sequential Logic Circuits Using VHDL.</p>
6	Open Elective - I Essentials Of Analog And Digital Electronics	<p>Design And Develop Circuits Using Analog And Digital Components. <ul style="list-style-type: none"> • Understand The Different Generators And Analyzers. • Appreciate The Use Of Display Units. • Design Analog To Digital And Digital To Analog Converters </p>
	Microprocessors & Microcontrollers Laboratory	<p>Write Assembly Language Program Using 8086 Micro Based On Arithmetic, Logical, And</p>

		Shift Operations. <ul style="list-style-type: none"> • Interface 8086 With I/O And Other Devices. • Do Parallel And Serial Communication Using 8051 & PIC 18 Micro Controllers
	Employability Skills	To Enhance The Soft And Hard Skills Of Students Based On Industry Needs And Helping The Student To Get The Employment In The Competitive Industrial Environment. (I) Aptitude Skill (Ii) Soft Skills (Iii) Skills Required For Campus Placement Interview

IV 4-1- EEE

S.No	Name Of The Subject	Course Outcomes
1	Utilization Of Electrical Energy	Able To Identify A Suitable Motor For Electric Drives And Industrial Applications <ul style="list-style-type: none"> • Able To Identify Most Appropriate Heating Or Welding Techniques For Suitable Applications. • Able To Understand Various Level Of Illuminosity Produced By Different Illuminating Sources. • Able To Estimate The Illumination Levels Produced By Various Sources And Recommend The Most Efficient Illuminating Sources And Should Be Able To Design Different Lighting Systems By Taking Inputs And Constraints In View. • Able To Determine The Speed/Time Characteristics Of Different Types Of Traction Motors. • Able To Estimate Energy Consumption Levels At Various Modes Of Operation.
2	Linear Ic Applications	Design Circuits Using Operational Amplifiers For Various Applications. <ul style="list-style-type: none"> • Analyze And Design Amplifiers And Active Filters Using Op-Amp. • Diagnose And Trouble-Shoot Linear Electronic Circuits. • Understand The Gain-Bandwidth Concept And Frequency Response Of The Amplifier Configurations. • Understand Thoroughly The Operational Amplifiers With Linear Integrated Circuits.
3	Power System Operation & Control	Able To Compute Optimal Scheduling Of Generators. <ul style="list-style-type: none"> • Able To Understand Hydrothermal Scheduling. • Understand The Unit Commitment Problem. • Able To Understand Importance Of The Frequency. • Understand Importance Of PID Controllers In Single Area And Two Area Systems. • Will Understand Reactive Power Control And Compensation For Transmission Line
4	Switchgear And Protection	Able To Understand The Principles Of Arc Interruption For Application To High Voltage Circuit Breakers Of Air, Oil, Vacuum, SF6 Gas Type.

		<ul style="list-style-type: none"> • Ability To Understand The Working Principle And Operation Of Different Types Of Electromagnetic Protective Relays. • Students Acquire Knowledge Of Faults And Protective Schemes For High Power Generator And Transformers. • Improves The Ability To Understand Various Types Of Protective Schemes Used For Feeders And Bus Bar Protection. • Able To Understand Different Types Of Static Relays And Their Applications. • Able To Understand Different Types Of Over Voltages And Protective Schemes Required For Insulation Co-Ordination.
5	Special Electrical Machines	<ul style="list-style-type: none"> • Distinguish Between Brush Dc Motor And Brush Less Dc Motor. • Explain The Performance And Control Of Stepper Motors, And Their Applications. • Explain Theory Of Operation And Control Of Switched Reluctance Motor. • Explain The Theory Of Travelling Magnetic Field And Applications Of Linear Motors. • Understand The Significance Of Electrical Motors For Traction Drives.
6	Power Systems & Simulation Laboratory	Determine The Parameters Of Various Power System Components Which Are Frequently Occur In Power System Studies And He Can Execute Energy Management Systems Functions At Load Dispatch Center
	Electrical Simulation Laboratory	<ul style="list-style-type: none"> • Able To Simulate Integrator Circuit, Differentiator Circuit, Boost Converter, Buck Converter, Full Converter And PWM Inverter. • Able To Simulate Transmission Line By Incorporating Line, Load And Transformer Models. • Able To Perform Transient Analysis Of RLC Circuit And Single Machine Connected To Infinite Bus(SMIB).

4-2 EEE

S.No	Name Of The Subject	Course Outcomes
1	Digital Control Systems	<p>The Students Learn The Advantages Of Discrete Time Control Systems And The “Know How” Of Various Associated Accessories.</p> <ul style="list-style-type: none"> • The Learner Understand Z-Transformations And Their Role In The Mathematical Analysis Of Different Systems(Like Laplace Transforms In Analog Systems). • The Stability Criterion For Digital Systems And Methods Adopted For Testing The Same Are Explained. • Finally, The Conventional And State Space Methods Of

		Design Are Also Introduced
2	HVDC Transmission	<p>Learn Different Types Of HVDC Levels And Basic Concepts</p> <ul style="list-style-type: none"> • Know The Operation Of Converters • Acquire Control Concept Of Reactive Power Control And AC/DC Load Flow. • Understand Converter Faults, Protection And Harmonic Effects • Design Low Pass And High Pass Filters
3	Electrical Distribution Systems	<p>Able To Understand Various Factors Of Distribution System.</p> <ul style="list-style-type: none"> • Able To Design The Substation And Feeders. • Able To Determine The Voltage Drop And Power Loss • Able To Understand The Protection And Its Coordination. • Able To Understand The Effect Of Compensation For P.F Improvement. • Able To Understand The Effect Of Voltage Control..
4	Seminar	-----
5	Flexible Alternating Current Transmission Systems	<p>Understand power Flow Control In Transmission Lines Using FACTS Controllers.</p> <ul style="list-style-type: none"> • Explain Operation And Control Of Voltage Source Converter. • Analyze Compensation Methods To Improve Stability And Reduce Power Oscillations In The Transmission Lines. • Explain The Method Of Shunt Compensation Using Static VAR Compensators. • Understand The Methods Of Compensations Using Series Compensators. • Explain Operation Of Unified Power Flow Controller (UPFC).
6	Project	

S.No	Name Of The Subject	Course Outcomes
1	<p>Vector Calculus, Fourier Transforms And PDE (M-III)</p> <p>R2021011</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Interpret The Physical Meaning Of Different Operators Such As Gradient, Curl And Divergence (L5) <input type="checkbox"/> Estimate The Work Done Against A Field, Circulation And Flux Using Vector Calculus (L5) <input type="checkbox"/> Apply The Laplace Transform For Solving Differential Equations (L3) <input type="checkbox"/> Find Or Compute The Fourier Series Of Periodic Signals (L3) <input type="checkbox"/> Know And Be Able To Apply Integral Expressions For The Forwards And Inverse Fourier Transform To A Range Of Non-Periodic Waveforms (L3) <input type="checkbox"/> Identify Solution Methods For Partial Differential Equations That Model Physical Processes (L3)
2	<p>Mechanics Of Solids</p> <p>R2021031</p>	<p>CO1: Model & Analyze The Behavior Of Basic Structural Members Subjected To Various Loading And Support Conditions Based On Principles Of Equilibrium.</p> <p>CO2: Understand The Apply The Concept Of Stress And Strain To Analyze And Design Structural Members And Machine Parts Under Axial, Shear And Bending Loads, Moment And Torsional Moment.</p> <p>CO3: Students Will Learn All The Methods To Analyze Beams, Columns, Frames For Normal, Shear, And Torsion Stresses And To Solve Deflection Problems In Preparation For The Design Of Such Structural Components. Students Are Able To Analyse Beams And Draw Correct And Complete Shear And Bending Moment Diagrams For beams.</p> <p>CO4: Students Attain A Deeper Understanding Of The Loads, Stresses, And Strains Acting On A Structure And Their Relations In The Elastic Behavior</p> <p>CO5: Design And Analysis Of Industrial Components Like Pressure Vessels.</p>
3	<p>Fluid Mechanics & Hydraulic Machines</p> <p>R2021032</p>	<p>CO1: The Basic Concepts Of Fluid Properties.</p> <p>CO2: The Mechanics Of Fluids In Static And Dynamic Conditions.</p> <p>CO3: Boundary Layer Theory, Flow Separation And Dimensional Analysis.</p> <p>CO4: Hydrodynamic Forces Of Jet On Vanes In Different Positions.</p> <p>CO5: Working Principles And Performance Evaluation Of</p>

		Hydraulic Pump And Turbines.
4	Production Technology R2021033	CO1: Able To Design The Patterns And Core Boxes For Metal Casting Processes CO2: Able To Design The Gating System For Different Metallic Components CO3: Know The Different Types Of Manufacturing Processes CO4: Be Able To Use Forging, Extrusion Processes CO5: Learn About The Different Types Of Welding Processes Used For Special Fabrication.
5	Kinematics Of Machinery R2021034	Contrive A Mechanism For A Given Plane Motion With Single Degree Of Freedom. Suggest And Analyze A Mechanism For A Given Straight Line Motion And Automobile Steering Motion. Analyze The Motion (Velocity And Acceleration) Of A Plane Mechanism. Suggest And Analyze Mechanisms For A Prescribed Intermittent Motion Like Opening And Closing Of IC Engine Valves Etc. Select A Power Transmission System For A Given Application And Analyze Motion Of Different Transmission Systems
6	Computer Aided Engineering Drawing Practice R2021035	1. Student Get Exposed On Working Ofsheet Metal With Help Of Development Ofsurfaces. 2. Student Understands How To Know The Hidden Details Of Machine Components With The Help Of Sections And Interpenetrations Of Solids. 3. Student Shall Exposed To Modeling Commands For Generating 2D And 3D Objects Using Computer Aided Drafting Tools Which Are Useful To Create Machine Elements For Computer Aided Analysis.
7	Fluid Mechanics &Hydraulic Machines Lab R2021036	Students Be Able To Practically Understand Working Of Hydraulic Machines Like Turbines, Pumps. Understand Impact Of Jet, Venturi Meter, Orifice Meter

8	Production Technology Lab R2021037	Hands-On Practical Exposure On Manufacturing Processes And Equipment Like Pattern Making, Molding, And Welding Processes.
9	Drafting And Modeling Lab R2021038	Apply CATIA Software To Prepare 2-D And 3-D Models
10	Essence Of Indian Traditional Knowledge R2021039	<ul style="list-style-type: none"> <input type="checkbox"/> Understand The Concept Of Traditional Knowledge And Its importance <input type="checkbox"/> Know The Need And Importance Of Protecting Traditional knowledge <input type="checkbox"/> Know The Various Enactments Related To The Protection Of Traditional knowledge <input type="checkbox"/> Understand The Concepts Of Intellectual Property To Protect The Traditional knowledge

II B.Tech II - Sem

Regulation: R20

1	Material Science & Metallurgy R2022012	<p>CO1: Understand The Crystalline Structure Of Different Metals And Study The Stability Of Phases In Different Alloy Systems.</p> <p>CO2: Study The Behavior Of Ferrous And Non Ferrous Metals And Alloys And Their Application In Different Domains</p> <p>CO3: Able To Understand The Effect Of Heat Treatment, Addition Of Alloying Elements On Properties Of Ferrous Metals.</p> <p>CO4: Grasp The Methods Of Making Of Metal Powders And Applications Of Powder Metallurgy</p> <p>CO5: Comprehend The Properties And Applications Of Ceramic, Composites And Other Advanced Methods.</p>
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2	<p>Complex Variables And Statistical Methods R2022011</p>	<ul style="list-style-type: none"> • Apply Cauchy-Riemann Equations To Complex Functions In Order To Determine Whether A Given Continuous Function Is Analytic (L3) • Find The Differentiation And Integration Of Complex Functions Used In Engineering Problems (L5) • Make Use Of The Cauchy Residue Theorem To Evaluate Certain Integrals (L3) • Apply Discrete And Continuous Probability Distributions (L3) • Design The Components Of A Classical Hypothesis Test (L6) • Infer The Statistical Inferential Methods Based On Small And Large Sampling Tests (L4)
3	<p>Dynamics Of Machinery R2022032</p>	<ol style="list-style-type: none"> 1. To Compute The Frictional Losses And Transmission In Clutches, Brakes And dynamometers 2. To Determine The Effect Of Gyroscopic Couple In Motor Vehicles, Ships And aeroplanes 3. To Analyze The Forces In Four Bar And Slider Crank Mechanisms And Design A flywheel 4. To Determine The Rotary Unbalanced Mass In Reciprocating equipment 5. To Determine The Unbalanced Forces And Couples In Reciprocating And Radial engines 6. To Determine The Natural Frequencies Of Discrete Systems Undergoing Longitudinal, Torsional And Transverse Vibrations.
4	<p>Thermal Engineering-I R2022033</p>	<p>CO1: Derive The Actual Cycle From Fuel-Air Cycle And Air- Standard Cycle For All Practical Applications. CO2: Explain Working Principle And Various Components Of IC Engine CO3: Explain Combustion Phenomenon Of CI And SI Engines And Their Impact On Engine Variables. CO4: Analyze The Performance Of An IC Engine Based On The Performance Parameters. CO5: Explain The Cycles And Systems Of A Gas Turbine And Determine The Efficiency Of Gas Turbine. CO6: Explain The Applications And Working Principle Of Rockets And Jet Propulsion.</p>

5	<p style="text-align: center;">Industrial Engineering And Management R2022034</p>	<p>1. Design And Conduct Experiments, Analyse, Interpret Data And Synthesize Valid conclusions 2. Design A System, Component, Or Process, And Synthesize Solutions To Achieve Desired needs 3. Use The Techniques, Skills, And Modern Engineering Tools Necessary For Engineering Practice With Appropriate Considerations For Public Health And Safety, Cultural, Societal, And Environmental Constraints 4. Function Effectively Within Multi-Disciplinary Teams And Understand The Fundamental Precepts Of Effective Project Management</p>
6	<p style="text-align: center;">Mechanics Of Solids And Metallurgy Lab R2022035</p>	<p>Practical Exposure On The Microstructures Of Various Materials And Their Hardness Evaluation. Also Practical Knowledge On The Evaluation Of Material Properties Through Various Destructive Testing Procedures.</p>
7	<p style="text-align: center;">Machine Drawing Practice R2022036</p>	<p>CO1. Draw And Represent Standard Dimensions Of Different Mechanical Fasteners And Joints And Couplings. CO2. Draw Different Types Of Bearings Showing Different Components. CO3. Assemble Components Of A Machine Part And Draw The Sectional Assembly Drawing Showing The Dimensions Of All The Components Of The Assembly As Per Bill Of Materials CO4. Select And Represent Fits And Geometrical Form Of Different Mating Parts In Assembly Drawings. CO5: To Prepare Manufacturing Drawings Indicating Fits, Tolerances, Surface Finish And Surface Treatment Requirements.</p>
8	<p style="text-align: center;">Theory Of Machines Lab R2022037</p>	<p>The Student Be Able To Understand Practical Working Of A) Governors 2) Flywheels 3) Spring Mass System 4) Screw-Jack And Gears</p>
9	<p style="text-align: center;">Python Programming Lab R2022038</p>	<p>Able To Apply Python Programming Skills To Solve Problems In The Field Of Engineering</p>

1	<p style="text-align: center;">Dynamics Of Machinery R1931031</p>	<p>(1) To Compute The Frictional Losses And Transmission In Clutches, Brakes And Dynamometers (2) To Determine The Effect Of Gyroscopic Couple In Motor Vehicles, Ships And Aeroplanes (3) To Analyze The Forces In Four Bar And Slider Crank Mechanisms And Design A Flywheel (4) To Determine The Rotary Unbalanced Mass In Reciprocating Equipment (5) To Determine The Unbalanced Forces And Couples In Reciprocating And Radial Engines (6) To Determine The Natural Frequencies Of Discrete Systems Undergoing Longitudinal, Torsional And Transverse Vibrations.</p>
2	<p style="text-align: center;">Design Of Machine Members-II R1931032</p>	<ol style="list-style-type: none"> 1. Select The Suitable Bearing Based On The Application Of The Loads And Predict The Life Of The Bearing. 2. Design Of IC Engines Parts. 3. Design Of Power Transmission Elements Such As Gears, Belts, Chains, Pulleys, Ropes, Levers And Power Screws. 4. Design Spur & Helical Gear For Different Engineering Applications.
3	<p style="text-align: center;">Mechanical Measurements & Metrology R1931038</p>	<p>CO1: Describe The Construction And Working Principles Of Measuring Instruments For Measurement Of Displacement And Speed And Select Appropriate Instrument For A Given Application. CO2: Describe The Construction And Working Principles Of Measuring Instruments For Strain, Force, Torque, Power, Acceleration And Vibration And Select Appropriate Instrument For A Given Application. CO3: Explain Shaft Basis System And Hole Basis Systems For Fits And Represent Tolerances For A Given Fit As Per The Shaft Basis System And Hole Basis System And Design Limit Gauges Based On The Tolerances For Quality Check In Mass Production. CO4: Explain Methods For Linear, Angle And Flatness Measurements And Select A Suitable Method And Its Relevant Instrument For A Given Application. CO5: To Measure The Threads, Gear Tooth Profiles, Surface Roughness And Flatness Using Appropriate Instruments And Analyze The Data.</p>

4	<p style="text-align: center;">Managerial Economics And Financial Accountancy</p> <p style="text-align: center;">R1931034</p>	<p>The Learner Is Equipped With The Knowledge Of Estimating The Demand And Demand Elasticities For A Product.</p> <p>The Pupil Is Also Ready To Understand The Nature Of Different Markets And Price Output Determination Under Various Market Conditions And Also To Have The Knowledge Of Different Business Units.</p> <p>The Learner Is Able To Prepare Financial Statements And The Usage Of Various Accounting Tools For Analysis.</p> <p>The Learner Can Able To Evaluate Various Investment Project Proposals With The Help Of Capital Budgeting Techniques For Decision Making.</p>
5	<p style="text-align: center;">IC Engines & Gas Turbines</p> <p style="text-align: center;">R1931035</p>	<p>The Knowledge Of Understanding Of The Input-Output-Cost Relationships And Estimation Of The Least Cost Combination Of Inputs.</p>
6	<p style="text-align: center;">Thermal Engineering Lab</p> <p style="text-align: center;">R1931036</p>	<p>The Student Be Able To Understand Practical Working Of</p> <p>A) IC Engines 2) Compressors 3) Fuel Characteristics 4) Valve And Port Working Principles</p>
7	<p style="text-align: center;">Theory Of Machines Lab</p> <p style="text-align: center;">R1931037</p>	<p>The Student Be Able To Understand Practical Working Of</p> <p>A) Governors 2) Flywheels 3) Spring Mass System 4) Screw-Jack And Gears</p>
8	<p style="text-align: center;">Mechanical Measurements & Metrology Lab</p> <p style="text-align: center;">R1931038</p>	<p>Student Will Become Familiar With The Different Instruments That Are Available For Linear, Angular, Roundness And Roughness Measurements They Will Be Able To Select And Use The Appropriate Measuring Instrument According To A Specific Requirement (In Terms Of Accuracy, Etc)</p> <p>Students Will Be Able To Select Proper Measuring Instrument And Know Requirement Of Calibration, Errors In Measurement Etc. They Can Perform Accurate Measurements.</p>
9	<p style="text-align: center;">Socially Relevant Project</p> <p style="text-align: center;">R1931039</p>	<p>Apply Engineering Skills To Solve Practical Problems In Our Current Society</p>

1	Operations Research	<ol style="list-style-type: none"> 1. Formulate The Resource Management Problems And Identify Appropriate Methods To Solve Them 2. Apply LPP, Transportation And Assignment Models To Optimize The Industrial Resources 3. Solve Decision Theory Problems Through The Application Of Game Theory 4. Apply The Replacement And Queuing Models To Increase The Efficiency of the system 5. Model The Project Management Problems Through CPM And PERT
2	Heat Transfer R1632034	<p>CO1: Compute Rate Of Heat Transfer For 1D, Steady State Composite Systems Without Heat Generation.</p> <p>CO2: Analyze The System With Heat Generation, Variable Thermal Conductivity, Fins And 1D Transient Conduction Heat Transfer Problems.</p> <p>CO3: Develop The Empirical Equations For Forced Convection Problems By Using Buckingham's Pi Theorem.</p> <p>CO4: Compute The Rate Of Heat Transfer For Natural Convection Systems And Design And Analysis Of Heat Exchangers.</p> <p>CO5: Solve The Heat Transfer Systems With Phase Change And Radiation.</p>
3	CAD/CAM R1641032	<ol style="list-style-type: none"> 1. Describe The Mathematical Basis In The Technique Of Representation Of Geometric Entities Including Points, Lines, And Parametric Curves, Surfaces And Solid, And The Technique Of Transformation Of Geometric Entities Using Transformation Matrix 2. Describe The Use Of GT And CAPP For The Product Development 3. Identify The Various Elements And Their Activities In The Computer Integrated Manufacturing Systems.
4	Refrigeration & Air Conditioning R1632033	<ul style="list-style-type: none"> <input type="checkbox"/> Differentiate Between Different Types Of Refrigeration Systems With Respect To Engineering Applications <input type="checkbox"/> Thermodynamically Analyse Refrigeration And Air Conditioning Systems And Evaluate Performance Parameters <input type="checkbox"/> Apply The Principles Of Psychrometrics To Design The Air Conditioning Loads For The Industrial Applications <input type="checkbox"/> Perform Cooling Load Calculations And Select The

		Appropriate Process And Equipment For The Required Comfort And Industrial Air-Conditioning.
5	Mechatronics R1641031	CO1. Shall Be Able To Use The Various Mechatronics Systems Devices And Components In The Design Of Electro Mechanical Systems. CO1: Explain Mechatronics Design Process And Outline Appropriate Sensors And Actuators For Engineering Applications CO2: Develop A Simulation Model For Simple Physical Systems CO3: Write Simple Microcontroller Programs CO4: Explain Linearization Of Nonlinear Systems And Elements Of Data Acquisition CO5: Explain Various Applications Of Design Of Mechatronic Systems
6	Simulation Of Mechanical Systems Lab	Able To Use Matlab To Simulate Mechanical Systems Like Spring Mass System, Steering Mechanism, Linkage Mechanism
7	Heat Transfer Lab	The Student Should Be Able To Evaluate The Amount Of Heat Exchange For Plane, Cylindrical & Spherical Geometries And Should Be Able To Compare The Performance Of Extended Surfaces And Heat Exchangers
8	CAD/CAM Lab R1641037	1. The Student Will Be Able To Appreciate The Utility Of The Modeling Tools In Creating 2D And 3D Drawings. 2. Use Of These Tools For Any Engineering And Real Time Applications 3. Acquire Knowledge On Utilizing These Tools For A Better Project In Their Curriculum As Well As They Will Be Prepared To Handle Industry Problems With Confidence When It Matters To Use These Tools In Their Employment

1	<p>Mechatronics R1641031</p>	<p>The Student Shall Be Able To Use The Various Mechatronics Systems Devices And Components In The Design Of Electro Mechanical Systems.</p>
2	<p>CAD/CAM R1641032</p>	<p>1. Describe The Mathematical Basis In The Technique Of Representation Of Geometric Entities Including Points, Lines, And Parametric Curves, Surfaces And Solid, And The Technique Of Transformation Of Geometric Entities Using Transformation Matrix 2. Describe The Use Of GT And CAPP For The Product Development 3. Identify The Various Elements And Their Activities In The Computer Integrated Manufacturing Systems.</p>
3	<p>Finite Element Methods R1641033</p>	<p>1. Understand The Concepts Behind Variational Methods And Weighted Residual Methods In FEM 2. Identify The Application And Characteristics Of FEA Elements Such As Bars, Beams, Plane And Isoparametric Elements, And 3-D Element 3. Develop Element Characteristic Equation Procedure And Generation Of Global Stiffness Equation Will Be Applied. 4. Able To Apply Suitable Boundary Conditions To A Global Structural Equation, And Reduce It To A Solvable Form. 5. Able To Identify How The Finite Element Method Expands Beyond The Structural Domain, For Problems Involving Dynamics, Heat Transfer, And Fluid Flow.</p>
4	<p>Power Plant Engineering R1641034</p>	<p>Student Can Understand Various Conventional Methods Of Power Generation And Principle Of Operation And Performance Of Respective Prime Movers Along With Their Economics And Their Impact On Environment.</p>
5	<p>Additive Manufacturing R164103C</p>	<p>The Student Shall Be Able To Identify The Use Of Rapid Prototyping Techniques In The Manufacturing Of Complex Components That Are Otherwise Very Difficult To Manufacture.</p>
6	<p>Advanced Materials R164103D</p>	<p>Student Will Be Able To Understand Composite Material Mechanics, Reinforcements, Manufacturing Methods And Nano Materials</p>

7	CAD/CAM Lab R1641037	<ol style="list-style-type: none"> 1. The Student Will Be Able To Appreciate The Utility Of The Tools Like ANSYS Or FLUENT In Solving Real Time Problems And Day To Day Problems. 2. Use Of These Tools For Any Engineering And Real Time Applications 3. Acquire Knowledge On Utilizing These Tools For A Better Project In Their Curriculum As Well As They Will Be Prepared To Handle Industry Problems With Confidence When It Matters To Use These Tools In Their Employment
8	Mechatronics Lab R1641038	Students Will Understand PLC Programming, Automation Studio Software, MATLAB Programming.

IV B.Tech II - Sem

Regulation: R16

1	Production Planning And Control R1642031	<ol style="list-style-type: none"> 1. Understand The Concepts Of Production And Service Systems; 2. The Ability To Apply Principles And Techniques In The Design, Planning And Control Of These Systems To Optimise/Make Best Use Of Resources In Achieving Their Objectives. 3. Identify Different Strategies Employed In Manufacturing And Service Industries To Plan Production And Control Inventory. 4. Learn Measurement Of The Effectiveness, Identify Likely Areas For Improvement, Develop And Implement Improved Planning And Control Methods For Production Systems.
2	Unconventional Machining Processes R1642032	After Completion Of Course, The Student Shall Understand The Principle Of Working, Mechanism Of Metal Removal In The Various Unconventional Machining Process. The Student Is Able To Identify The Process Parameters, Their Effect And Applications Of Different Processes.
3	Automobile Engineering R1642033	The Student After Undergoing The Course, Shall Visualize The Layout Of An Automobile And Its Systems Like Transmission, Steering, Suspension, Braking, Safety Etc And Should Know The Vehicle Troubleshooting.
4	Non Destructive Evaluation R164203B	<ol style="list-style-type: none"> 1. Comprehensive, Theory Based Understanding Of The Techniques And Methods Of Non Destructive Testing 2. Apply Methods Knowledge Of Non Destructive Testing To Evaluate Products Of Railways, Automobiles, Aircrafts, Chemical Industries Etc.

S.No	Name Of The Subject	Course Outcomes
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5	Seminar R1642045	Improved Communication Skills And Body Language
6	Project R1642046	Students Will Be Able To Practically Apply Knowledge Of Mechanical Engineering Subjects

I B.Tech II Sem

1	<p>Engineering Geology</p> <p>R201105</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Identify And Classify The Geological Minerals <input type="checkbox"/> Measure The Rock Strengths Of Various Rocks <input type="checkbox"/> Classify And Measure The Earthquake Prone Areas To Practice The Hazard Zonation <input type="checkbox"/> Classify, Monitor And Measure The Landslides And Subsidence <input type="checkbox"/> Prepares, Analyses And Interpret The Engineering Geologic Maps <input type="checkbox"/> Analyses The Ground Conditions Through Geophysical Surveys. <input type="checkbox"/> Test The Geological Material And Ground To Check The Suitability Of Civil Engineering Project Construction.
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I B.Tech I Sem CIVIL R20

I B.Tech II Sem R20

S.No	Name Of The Subject	Course Outcomes
1	Environmental Science	<ul style="list-style-type: none"> <input type="checkbox"/> Overall Understanding Of The Natural Resources. <input type="checkbox"/> Basic Understanding Of The Ecosystem And Its Diversity. <input type="checkbox"/> Acquaintance On Various Environmental Challenges Induced Due To Unplanned Anthropogenic Activities. <input type="checkbox"/> An Understanding Of The Environmental Impact Of Developmental Activities. <input type="checkbox"/> Awareness On The Social Issues, Environmental Legislation And Global Treaties.

2	Building Materials And Concrete Technology	<p>1. Know Various Engineering Properties Of Building Construction Materials And Suggest Their Suitability</p> <p>2. Identify The Functional Role Of Ingredients Of Concrete And Apply This Knowledge To Concrete Mix</p> <p>Design</p> <p>3. Acquire And Apply Fundamental Knowledge In The Fresh And Hardened Properties Of Concrete</p>
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II B.TECH I SEM Civil

R20

S.No	Name Of The Subject	Course Outcomes
1	Mathematics Iii R2021011	<p><input type="checkbox"/> <input type="checkbox"/> Interpret The Physical Meaning Of Different Operators Such As Gradient, Curl And Divergence (L5)</p> <p><input type="checkbox"/> <input type="checkbox"/> Estimate The Work Done Against A Field, Circulation And Flux Using Vector Calculus (L5)</p> <p><input type="checkbox"/> <input type="checkbox"/> Apply The Laplace Transform For Solving Differential Equations (L3)</p> <p><input type="checkbox"/> <input type="checkbox"/> Find Or Compute The Fourier Series Of Periodic Signals (L3)</p> <p><input type="checkbox"/> <input type="checkbox"/> Know And Be Able To Apply Integral Expressions For The Forwards And Inverse Fourier Transform To A Range Of Non-Periodic Waveforms (L3)</p> <p><input type="checkbox"/> <input type="checkbox"/> Identify Solution Methods For Partial Differential Equations That Model Physical Processes (L3)</p>
2	Strength Of Materials I R2021012	<p><input type="checkbox"/> <input type="checkbox"/> The Student Will Be Able To Understand The Basic Materials Behavior Under The Influence Of Different External Loading Conditions And The Support Conditions</p> <p><input type="checkbox"/> <input type="checkbox"/> The Student Will Be Able To Draw The Diagrams Indicating The Variation Of The Key Performance Features Like Bending Moment And Shear Forces</p> <p><input type="checkbox"/> <input type="checkbox"/> The Student Will Have Knowledge Of Bending Concepts And Calculation Of Section Modulus And For Determination Of Stresses Developed In The Beams And Deflections Due To Various Loading Conditions</p> <p><input type="checkbox"/> <input type="checkbox"/> The Student Will Be Able To Assess Stresses Across Section Of The Thin And Thick Cylinders To Arrive At Optimum Sections To Withstand The Internal Pressure Using Lamé's Equation.</p>

3	Fluid Mechanics R2021013	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Understand The Various Properties Of Fluids And Their Influence On Fluid Motion And Analyse A Variety Of Problems In Fluid Statics And Dynamics. <input type="checkbox"/> <input type="checkbox"/> Calculate The Forces That Act On Submerged Planes And Curves. <input type="checkbox"/> <input type="checkbox"/> Ability To Analyse Various Types Of Fluid Flows. <input type="checkbox"/> <input type="checkbox"/> Apply The Integral Forms Of The Three Fundamental Laws Of Fluid Mechanics To Turbulent And Laminar Flow Through Pipes And Ducts In Order To Predict Relevant Pressures, Velocities And Forces. <input type="checkbox"/> <input type="checkbox"/> Able Measure The Quantities Of Fluid Flowing In Pipes, Tanks And Channels.
4	Surveying And Geometrics R2021014	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Apply The Knowledge To Calculate Angles, Distances And Levels <input type="checkbox"/> <input type="checkbox"/> Identify Data Collection Methods And Prepare Field Notes <input type="checkbox"/> <input type="checkbox"/> Understand The Working Principles Of Survey Instruments, Measurement Errors And Corrective <input type="checkbox"/> <input type="checkbox"/> Interpret Survey Data And Compute Areas And Volumes, Levels By Different Type Of Equipment And Relate The Knowledge To The Modern Equipment And Methodologies
5	Highway Engineering R2021015	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Plan Highway Network For A Given Area. <input type="checkbox"/> <input type="checkbox"/> Determine Highway Alignment And Design Highway Geometrics. <input type="checkbox"/> <input type="checkbox"/> Design Intersections And Prepare Traffic Management Plans <input type="checkbox"/> <input type="checkbox"/> Judge Suitability Of Pavement Materials And Design Flexible And Rigid Pavements

II B.TECHII SEM Civil R20

S.No	Name Of The Subject	Course Outcomes
1	Strength Of Materials Ii R2022012	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> The Student Will Be Able To Understand The Basic Concepts Of Principal Stresses Developed In A Member When It Is Subjected To Stresses Along Different Axes And Design The Sections. <input type="checkbox"/> <input type="checkbox"/> The Student Can Assess Stresses In Different Engineering Applications Like Shafts, Springs, Columns And Struts Subjected To Different Loading Conditions
2	Hydraulics And Hydraulic Machinery R2022013	<ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Solve Uniform And Non-Uniform Open Channel Flow Problems. <input type="checkbox"/> <input type="checkbox"/> Apply The Principals Of Dimensional Analysis And Similitude In Hydraulic Model Testing.

		<input type="checkbox"/> <input type="checkbox"/> Understand The Working Principles Of Various Hydraulic Machineries And Pumps.
3	Environmental Engineering - R2022014	<input type="checkbox"/> <input type="checkbox"/> Select A Source Based On Quality And Quantity And Estimate Design Population And Water Demand <input type="checkbox"/> <input type="checkbox"/> Design A Water Treatment Plant For A Village/City <input type="checkbox"/> <input type="checkbox"/> Design A Sewer By Estimating Dwf And Strom Water Flow And Plumbing System For Buildings <input type="checkbox"/> <input type="checkbox"/> Design A Sewage Treatment Plant For A Town/City.

IIIB.TECH I SEMCIVIL R19

S.No	Name Of The Subject	Course Outcomes
1	Structural Analysis Pc501	Distinguish Between The Determinate And Indeterminate structures. <ul style="list-style-type: none"> • Identify The Behaviour Of Structures Due To The Expected Loads, Including The Moving Loads, Acting On The structure. • Estimate The Bending Moment And Shear Forces In Beams For Different Fixity Conditions. • Analyze The Continuous Beams Using Various Methods -, Three Moment Method, Slope Deflection Method, Energy theorems. • Draw The Influence Line Diagrams For Various Types Of Moving Loads On Beams/Bridges. • Analyze The Loads In Pratt And Warren Trusses When Loads Of Different Types And Spans Are Passing Over The truss
2	Concrete Technology Pc502	Understand Basic Concepts Of Concrete. <ul style="list-style-type: none"> • Realize Importance Of Quality Of concrete. • Familiarize Basic Ingredients Of Concrete And Their Role In Concrete And Their Behaviour In The field. • Test Fresh Concrete Properties And Hardened Concrete properties. • Evaluate Ingredients Of Concrete Through Lab Tests. Design Concrete Mix By Is method. • Familiarize Basic Concepts Of Special Concrete And Their Production And Applications. Understand The Behaviour Of Concrete In Various environments
3	Water Resources Engineering - I Pc503	Be Able To Quantify Major Hydrologic Components And Apply Key Concepts To Several Practical Areas Of Engineering Hydrology And Related Design aspects <ul style="list-style-type: none"> • Develop Intensity-Duration-Frequency And Depth-Area Duration Curves To Design Hydraulic structures. • Ability To Develop Design Storms And Carry Out Frequency analysis • Be Able To Determine Storage Capacity And Life Of reservoirs And Develop Unit Hydrograph And Synthetic Hydrograph.

		<ul style="list-style-type: none"> • Be Able To Estimate Flood Magnitude And Carry Out Flood Routing. • Be Able To Determine Aquifer Parameters And Yield Of wells. • Ability To Develop The Hydrological Models.
4	<p>Environmental Engineering - II</p> <p>Pe501</p>	<p>Plan And Design The Sewerage Systems By Estimating The Flow</p> <p>Design Of Plumbing For An Apartment, Gated Community Or Hotels Or Individual Houses And Select The Appropriate Appurtenances In The Sewerage Systems</p> <p>Estimation Of Bod And Cod And Suggest A Suitable Disposal Method With Respect To Effluent Standards, And Identify The Critical Point Of Pollution In A River For A Specific Amount Of Pollutant Disposal Into The River</p> <p>Analyze Sewage And Design Suitable Treatment System For Sewage Treatment For A Village/City.</p> <p>Design Of Sewage Treatment Systems Like Septic Tank Soak Pit System And Fab Reactor For Buildings And Understanding Tertiary Treatment Of Sewage</p>
5	<p>Program Elective – I</p> <p>A). Repair & Rehabilitation Of Buildings</p> <p>Oe501</p>	<p>Recognize The Mechanisms Of Degradation Of Concrete Structures And To Design Durable Concrete Structures.</p> <p>2. Conduct Field Monitoring And Non-Destructive Evaluation Of Concrete Structures.</p> <p>3. Design And Suggest Repair Strategies For Deteriorated Concrete Structures Including Repairing With Composites.</p> <p>4. Understand The Methods Of Strengthening Methods For Concrete Structures</p> <p>5. Assessment Of The Serviceability And Residual Life Span Of Concrete Structures By Visual Inspection And In Situ Tests</p> <p>6. Evaluation Of Causes And Mechanism Of Damage</p> <p>7. Evaluation Of Actual Capacity Of The Concrete Structure</p> <p>Maintenance Strategies</p> <p>8. Repair / Rehabilitate / Strengthening Techniques By Using Traditional And Advanced Materials And Techniques</p>
6	<p>Open Elective – I B)</p> <p>Environmental Impact Assessment</p> <p>Oe501</p>	<p>Prepare Emp, Eis And Eia Report, Estimate Cost Benefit Ratio Of A Project</p> <p>B) Selection Of An Appropriate Eia Methodology</p> <p>C) Evaluation Of Impacts On Environment</p> <p>D) Evaluation Of Risk Assessment</p> <p>E) Know The Latest Acts And Guidelines Of Moef & Cc</p>
7	<p>Concrete Technology Lab</p>	<p>Determine Consistency And Fineness Of Cement.</p> <ul style="list-style-type: none"> • Determine Setting Times Of cement. • Determine Specific Gravity And Soundness Of cement. • Determine Compressive Strength Of cement.

	Pc506	<ul style="list-style-type: none"> • Determine Workability Of Cement Concrete By Compaction Factor, Slump And Vee – Beetests • Determine Specific Gravity Of Coarse Aggregate And Fine Aggregate By Sieve Analysis. • Determine Flakiness And Elongation Index Of aggregates. • Determine Bulking Of sand. • Understand Non-Destructive Testing Procedures On Concrete
8	Surveying Field Work - ii Pc507	<p>Finding The Distance Between Two Inaccessible points.</p> <p>3. Theodolite Survey: Finding The Height Of Far object.</p> <p>4. Tacheometric survey: Heights and distance problems using tachometric Principles. Work On Different Types Of Design Methods Carryout Analysis And Design Of Flexural Members And detailing Design Structures Subjected To Shear, Bond And Torsion Design Different Type Of Compression Members And Torsion</p>

IIIB.TECH II SEM Civil R19

1	Design & Drawing Of Reinforced Concrete Structures	<p>Work On Different Types Of Design Methods</p> <ul style="list-style-type: none"> • Carryout Analysis And Design Of Flexural Members And detailing • Design Structures Subjected To Shear, Bond And torsion • Design Different Type Of Compression Members And footings-
2	Water Resources Engineering – ii	<p>Be Able To Estimate Irrigation Water Requirements Ability To Design Irrigation Canals And Canal Network Plan An Irrigation System Design Irrigation Canal Structures Plan And Design Diversion Head Works Analyse Stability Of Gravity And Earth Dams Design Ogee Spillways And Energy Dissipation Works</p>
3	Geotechnical Engineering - I	<p>The Student Must Know The Definition Of The Various Quantities Related To Soil Mechanics And Establish Their Inter-Relationships.</p> <p>B. The Student Should Be Able To Know The Methods Of Determination Of The Various Index Properties Of The Soils And Classify The Soils.</p> <p>C. The Student Should Be Able To Know The Importance Of The Different Engineering Properties Of The Soil Such As Compaction, Permeability, Consolidation And Shear Strength And Determine Them In The Laboratory.</p> <p>D. The Student Should Be Able To Apply The Above Concepts In Day-To-Day Civil Engineering Practice.</p>
	Managerial Economics And Financial Analysis	<p>The Learner Is Equipped With The Knowledge Of Estimating The Demand And Demand Elasticities For A Product.</p> <p>The Knowledge Of Understanding Of The Input-Output-Cost Relationships And Estimation Of The Least Cost Combination Of Inputs.</p>

		<p>The Pupil Is Also Ready To Understand The Nature Of Different Markets And Price Output Determination Under Various Market Conditions And Also To Have The Knowledge Of Different Business Units.</p> <p>The Learner Is Able To Prepare Financial Statements And The Usage Of Various Accounting Tools For Analysis.</p> <p>The Learner Can Able To Evaluate Various Investment Project Proposals With The Help Of Capital Budgeting Techniques For Decision Making.</p>
4	<p>Program Elective – li A). Pre-Stressed Concrete</p>	<p>At The End Of This Course The Student Will Be Able To Understand Different Methods Of Prestressing</p> <p>Estimate Effective Prestress Including Short And Long Term losses</p> <p>Analyze And Design Prestressed Concrete Beams Under Flexure And shear</p> <p>Understand The Relevant Is Code Provisions For Prestressed Concrete</p>
5	<p>Program Elective – lb). Watershed Management</p>	<p>Calculate Watershed Parameters And Analyse Watershed Characteristics To Take Appropriate Management Action.</p> <p>Quantify Soil Erosion And Design Control Measures.</p> <p>Apply Land Grading Techniques For Proper Land Management .</p> <p>Suggest Suitable Harvesting Techniques For Better Watershed Management.</p> <p>Apply Appropriate Models For Watershed Management</p>
6	<p>Program Elective – lic). Advanced Foundation Engineering</p>	<p>Compute The Safe Bearing Capacity Of Footings Subjected To Vertical And Inclined Loads.</p> <p>B. Understand The Advanced Methods Of Settlement Computations And Proportion Foundation Footings.</p> <p>C. Appreciate The Methods Of Computing The Pull-Out Capacity And Negative Skin Friction Of Piles And Compute The Settlements Of Pile Groups In Clays.</p> <p>D. Appreciate The Problems Posed By Expansive Soils And The Different Foundation Practices Devised.</p> <p>E. Appreciate The Difference Between Isolated Footings And Combined Footings And Mat Foundations.</p>
7	<p>Engineering Lab</p>	<p>□□ Draw Some Conclusion And Decide Whether The Water Is Suitable For Drinking/Construction / Agriculture/ Industry.</p> <p>Estimate Chloride, Ec And Salinity Of Soil And Suggest Their Suitability For Construction/Agriculture</p> <p>Estimation Of The Strength Of The Sewage In Terms Of Bod And Cod And Decide Whether The Water Body Is Polluted Or Not With Reference To The Stated Parameters In The List Of Experiments</p> <p>Demonstration Of Various Instruments Used In Testing Of Water And Soil And Study Of Drinking Water Standards, Who Guidelines, Effluent Standards And Standards For Construction/ Agriculture/ Industry.</p>
	<p>Cad Lab</p>	<p>Model The Geometry Of Real-World Structure Represent The Physical</p>

		<p>Model Of Structural Element/Structure</p> <p>B) Perform Analysis</p> <p>C) Interpret From The Post Processing Results</p> <p>D) Design The Structural Elements And A System As Per Is Codes</p>
8	<p>Program Elective – li D). Urban Transportation Planning</p>	<p>Estimate Travel Demand For An Urban Area</p> <p>B. Plan The Transportation Network For A City</p> <p>C. Identify The Corridor And Plan For Providing Good Transportation Facilities.</p> <p>D. Evaluate Various Alternative Transportation Proposals</p>
9	<p>Program Elective – li E). Architecture And Town Planning</p>	<p>The Student Should Be Able To Distinguish Architectural Styles Of Eastern And Western World.</p> <p>B. The Student Should Understand The Importance Of Orders Of Architecture.</p> <p>C. Should Be Able To Compose Spaces Of Buildings Using Design Concepts, Planning Principles.</p> <p>D. Should Understand The Town Planning Standards, Landscaping Features And Regulations Controlling Expansion Of The Towns And The Cities.</p>
	<p>Socially Relevant Project</p>	<p>The Student(S) Are Be Able To Provide A Solutions The Technological Problems Of Society</p> <p>The Student(S) Is Able Suggest Technological Changes Which Suits Current Needs Of Society</p> <p>The Student(S) Are Able To Explain New Technologies Available For Problems Of The Society.</p> <p>Reference:</p> <p>Web Link: Http://iitk.Ac.In/New/Socially-Relevant-Research</p> <p>Https://Csie.litm.Ac.In/Socialprojectsiitm.Html</p> <p>(3) Http://Www.Iitkgp.Ac.In/Files/Csr/Csr_Education.Pdf</p>

<p>Refrigeration & Air Conditioning R1632033</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Differentiate Between Different Types Of Refrigeration Systems With Respect To Engineering Applications <input type="checkbox"/> Thermodynamically Analyse Refrigeration And Air Conditioning Systems And Evaluate Performance Parameters <input type="checkbox"/> Apply The Principles Of Psychrometrics To Design The Air Conditioning Loads For The Industrial Applications <input type="checkbox"/> Perform Cooling Load Calculations And Select The Appropriate Process And Equipment For The Required Comfort And Industrial Air-Conditioning.
<p>Mechatronics R1641031</p>	<p>Co1. Shall Be Able To Use The Various Mechatronics Systems Devices And Components In The Design Of Electro Mechanical Systems.</p> <p>Co1: Explain Mechatronics Design Process And Outline Appropriate Sensors And Actuators For Engineering Applications</p> <p>Co2: Develop A Simulation Model For Simple Physical Systems</p> <p>Co3: Write Simple Microcontroller Programs</p>

	<p>Co4: Explain Linearization Of Nonlinear Systems And Elements Of Data Acquisition</p> <p>Co5: Explain Various Applications Of Design Of Mechatronic Systems</p>
Simulation Of Mechanical Systems Lab	Able To Use Matlab To Simulate Mechanical Systems Like Spring Mass System, Steering Mechanism, Linkage Mechanism
Heat Transfer Lab	The Student Should Be Able To Evaluate The Amount Of Heat Exchange For Plane, Cylindrical & Spherical Geometries And Should Be Able To Compare The Performance Of Extended Surfaces And Heat Exchangers
Cad /Cam Lab R1641037	<ol style="list-style-type: none"> 1. The Student Will Be Able To Appreciate The Utility Of The Modeling Tools In Creating 2d And 3d Drawings. 2. Use Of These Tools For Any Engineering And Real Time Applications 3. Acquire Knowledge On Utilizing These Tools For A Better Project In Their Curriculum As Well As They Will Be Prepared To Handle Industry Problems With Confidence When It Matters To Use These Tools In Their Employment

IVB.Tech I - SemCivil

Regulation: R16

<p>Mechatronics R1641031</p>	<p>The Student Shall Be Able To Use The Various Mechatronics Systems Devices And Components In The Design Of Electro Mechanical Systems.</p>
<p>Cad/Cam R1641032</p>	<ol style="list-style-type: none"> 1. Describe The Mathematical Basis In The Technique Of Representation Of Geometric Entities Including Points, Lines, And Parametric Curves, Surfaces And Solid, And The Technique Of Transformation Of Geometric Entities Using Transformation Matrix 2. Describe The Use Of Gt And Capp For The Product Development 3. Identify The Various Elements And Their Activities In The Computer Integrated Manufacturing Systems.

<p>Finite Element Methods R1641033</p>	<ol style="list-style-type: none"> 1. Understand The Concepts Behind Variational Methods And Weighted Residual Methods In Fem 2. Identify The Application And Characteristics Of Fea Elements Such As Bars, Beams, Plane And Isoparametric Elements, And 3-D Element . 3. Develop Element Characteristic Equation Procedure And Generation Of Global Stiffness Equation Will Be Applied. 4. Able To Apply Suitable Boundary Conditions To A Global Structural Equation, And Reduce It To A Solvable Form. 5. Able To Identify How The Finite Element Method Expands Beyond The Structural Domain, For Problems Involving Dynamics, Heat Transfer, And Fluid Flow.
<p>Power Plant Engineering R1641034</p>	<p>Student Can Understand Various Conventional Methods Of Power Generation And Principle Of Operation And Performance Of Respective Prime Movers Along With Their Economics And Their Impact On Environment.</p>
<p>Additive Manufacturing R164103c</p>	<p>The Student Shall Be Able To Identify The Use Of Rapid Prototyping Techniques In The Manufacturing Of Complex Components That Are Otherwise Very Difficult To Manufacture.</p>
<p>Advanced Materials R164103d</p>	<p>Student Will Be Able To Understand Composite Material Mechanics, Reinforcements, Manufacturing Methods And Nano Materials</p>
<p>Cad/Cam Lab R1641037</p>	<ol style="list-style-type: none"> 1. The Student Will Be Able To Appreciate The Utility Of The Tools Like Ansys Or Fluent In Solving Real Time Problems And Day To Day Problems. 2. Use Of These Tools For Any Engineering And Real Time Applications 3. Acquire Knowledge On Utilizing These Tools For A Better Project In Their Curriculum As Well As They Will Be Prepared To Handle Industry Problems With Confidence When It Matters To Use These Tools In Their Employment
<p>Mechatronics Lab R1641038</p>	<p>Students Will Understand Plc Programming, Automation Studio Software, Matlab Programming</p>

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<p>1</p>	<p>Production Planning And Control R1642031</p>	<ol style="list-style-type: none"> 1. Understand The Concepts Of Production And Service Systems; 2. The Ability To Apply Principles And Techniques In The Design, Planning And Control Of These Systems To Optimise/Make Best Use Of Resources In Achieving Their Objectives. 3. Identify Different Strategies Employed In Manufacturing And Service Industries To Plan Production And Control Inventory. 4. Learn Measurement Of The Effectiveness, Identify Likely Areas For Improvement, Develop And Implement Improved Planning And Control Methods For Production Systems.
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2	Unconventional Machining Processes R1642032	After Completion Of Course, The Student Shall Understand The Principle Of Working, Mechanism Of Metal Removal In The Various Unconventional Machining Process. The Student Is Able To Identify The Process Parameters, Their Effect And Applications Of Different Processes.
3	Automobile Engineering R1642033	The Student After Undergoing The Course, Shall Visualize The Layout Of An Automobile And Its Systems Like Transmission, Steering, Suspension, Braking, Safety Etc And Should Know The Vehicle Troubleshooting.
4	Non Destructive Evaluation R164203b	1. Comprehensive, Theory Based Understanding Of The Techniques And Methods Of Non Destructive Testing 2. Apply Methods Knowledge Of Non Destructive Testing To Evaluate Products Of Railways, Automobiles, Aircrafts, Chemical Industries Etc.
5	Seminar R1642045	Improved Communication Skills And Body Language
6	Project R1642046	Students Will Be Able To Practically Apply Knowledge Of Mechanical Engineering Subjects
	I C). Reinforced Soil Structures	Understand The History And Mechanism Of Reinforced Soil B) Become Aware About Situations Where Geo-Synthetics Can Be Used. C) Know About Various Types Of Geo-Synthetics And Their Functions D) Be Able To Do Dimple Design Of Reinforced Soil Retaining Walls And Reinforced Earth Beds.
	Program Elective – I D). Traffic Engineering	Determine Traffic Speed, Volume, Travel Time And Density. B. Design Traffic Signals C. Determine Highway Capacity And Los
	Program Elective – I E). Construction Technology & Management	Appreciate The Importance Of Construction Planning B) Understand The Functioning Of Various Earth Moving Equipment C) Know The Methods Of Production Of Aggregate Products And Concreting And Usage Of Machinery Required For The Works. D) Apply The Gained Knowledge To Project Management And Construction Techniques