PROGRAM OUTCOMES (POs)

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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B.Tech I & II Sem Course outcomes for the Academic year 2022- 23			
S.NO.	**YEAR/SEM**	**COURSE NAME**	**Course Outcomes**
1	I/I	MATRICES & CALCULUS	**CO1 :** Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
			CO 2 : Find the Eigen values and Eigen vectors , Reduce the quadratic form to canonical form using orthogonal transformations.
			CO 3 : Analyse the nature of Sequences and Series.
			CO 4 : Solve the applications on the mean value theorems , Evaluate the improper integrals using Beta and Gamma functions
			CO 5 : Find the extreme values of functions of two variables with/without constraints
2	I/I	Applied Physics	**CO1 :** Understand the fundamental concepts of quantum behavior of matter in its micro state
			CO2 : The knowledge of fundamentals of Semiconductor physics, Optoelectronics enable the students to apply to various systems like communications, solar cell, photo cells and so on.
			CO3 : The main basics of Lasers and fiber optics relate the basic idea of total internal reflection to the propagation of light and make use of fibre concepts to solve numerical problems and relate to applications in engineering.
			CO4 : Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
			CO5 : Analyze the phenomena of electromagnetism and also to have the exposure on magnetic materials and dielectric materials.
3	I/I	AP LAB	**CO1 :** Able to understand the characteristics of Junction diode.
			CO2 : Students can acquire the knowledge on power and current characteristics of Semiconductor devices.
			CO3 : Students can identify the type of semiconducting material through Hall Effect.
			CO4 : Students learn the practical knowledge in quantum concepts by Photo electric effect.
			CO5 : Students can observe laser characteristics and optical fiber principles
4	I/II	Ordinary Differential Equations & Vector Calculus	**CO1 :** Identify whether the differential equation of first order is exact or not
			CO2 : Solve higher differential equations and apply the concept of differential equations to real world problems
			CO3 : Evaluate the multiple integrals ,finding the areas, volumes for cubes, spheres
			CO4 : Analysing vector and scalar point functions, scalar

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			potential functions
			CO5 : Evaluate the line, surface and volume integrals and converting from them one to another
5	I/II	**ENGINEERING CHEMISTRY**	**CO 1 :** Examine the atomic, molecular and electronic changes and band theory related to conductivity
			CO 2 : Develop suitable treatment schemes to remove the pollutants which are present in water as well as wastewater
			CO 3 : Design appropriate corrosion protection electrochemical techniques in order to control the corrosion of metals
			CO 4 : Design appropriate corrosion protection electrochemical techniques in order to control the corrosion of metals
			CO 5 : Produce the clear concept on basic spectroscopy and formulate medical and other fields.
6	I/I	**ENGLISH**	**CO 1 :** Use English language effectively in spoken and written forms
			CO 2 : Comprehend the given texts and respond appropriately
			CO 3 : Communicate confidently in various contexts and different cultures
			CO 4 : Acquire basic proficiency in English including reading and listening ,writing and speaking skills
			CO 5 : Prepare themselves for their careers which may require them to listen to , read , speak and write in English both for their professional and interpersonal communication in the globalized context
7	I/II	**EC LAB**	**CO 1 :** Determination of parameters like hardness and chloride content in water .
			CO 2 : Estimation of rate constant of a reaction from concentration.
			CO 3 : Determination of physical properties like adsorption & viscosity
			CO 4 : Determination of concentrations by instrumental method (cond. & potenti.)
			CO5 : Calculation of RF values of some organic molecules by TLC techniques
8	I/I	**ELCS LAB**	**CO1 :** Better understanding of nuances of English language through group activities
			CO 2 : Neutralization of accent for intelligibility
			CO 3 : Speaking skills with clarity and confidence which inturn enhances their employability skills
			CO 4 : train students to use language appropriately for public speaking and interviews

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			CO5 : focus on production and practice sounds of English language and to help the students with the use of everyday English in formal and informal contexts

Civil Engineering I&II Sem Course Outcomes for the Academic Year 2022-2023			
S.No.	**Year/Sem**	**Course Name**	**Course Outcomes**
1	**II/I**	**Surveying and Geomatics**	**CO1:**Calculate angles, distances and levels
			CO2: Identify data collection methods and prepare field notes
			CO3: Understand the working principles of survey instruments
			CO4: Estimate measurement errors and apply corrections
			CO5: Interpret survey data and compute areas and volumes
2	**II/I**	**Engineering geology**	**CO1:**Understand weathering process and mass movement
			CO2: Distinguish geological formations
			CO:3 Identify geological structures and process for rock mass quality
			CO:4 Identify subsurface information and groundwater potential sites through geophysical investigations
			CO:5 Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels
3	**II/I**	**Strength of Materials-1**	**CO:1**Analyze the statically determinate and inderminate problems.
			CO:2 Determine the stresses and strains in the members subjected to axial bending
			CO:3 Evaluate the slope and deflection of beams subjected to loads.
			CO:4 Determine the principal stresses and strains in structural members
			CO:5 Frame an idea to design a system, component or process
4	**II/I**	**Probability and Statistics**	**CO:1**Understasnd concepts of discrete probability, conditional probability, independence, and be able to apply these concepts to engineering applications
			CO:2 Be able to use statistical concepts to analyse and interpret engineering data.
			CO:3 Equipping students with essential tools for statistical analyses at the graduate level
			CO:4 Providing students with a formal treatement of probability theory
			CO:5 Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data

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5	II/I	**Fluid Mechanics**	**CO1:**Apply conservation laws to derive governing equations of fluid flows
			CO2: Compute hydrostatic and hydrodynamic forces.
			CO3: Analyze and design simple pipe systems.
			CO4: Apply principles of dimensional analysis to design experiments.
			CO5: Compute drag and lift coefficients.
6	II/I	**Surveying Lab**	**CO1:**Able to pereform chain survey and plotting of closed traverse and also obstacles
			CO2: Determines distance between two inaccessibles points with compass
			CO3: Perform reduced level and distances using tachometric survey
			CO4: Able to perform trigonometric leveling using theodolite for heights and distances problems.
			CO5: Determines Radiation method, intersection methods by plane table survey
7	II/I	**Strength of Materials Lab**	CO1:Conduct tension test on materiáls like steel etc.
			CO2:Conduct compression tests on spring, wood and concrete
			CO3:Conduct flexural and torsion test to determine elastic constants
			CO4:Determine hardness of metals
			CO5:Write a technical laboratory report
8	II/I	**Engineering geology Lab**	CO:1Undestsnd weathering process and mass movement
			CO:2Distinguish geological formations
			CO:3Identify geological structures and process for rock mass quality
			CO:4Identify subsurface information and groundwater potential sites through geophysical investigations
			CO:5Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels
9	II/I	**Constitution of India**	CO:1Understand the emergence and evaluation of Indian constitution
			CO:2Understand the structure and composition of Indian constitution

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			CO:3Understand and analyses federalism in the Indian context
			CO:4Analyse panchayathi Raj institutions as a medium of decentralization
			CO:5Understand and analyze the three organs of the state in the contemporary scenario
10	II/II	**Basic Electrical and Electronics Engineering**	CO:1To analyze and solve electrical circuits using network laws and theorems.
			CO:2To understand and analyze basic electrical and magnetic circuits
			CO:3To study the working principles of electrical machines
			CO:4To introduce components of low voltage electrical installations
			CO:5To identify and characterize diodes and various types of transistors
11	II/II	**Basic Mechanical Engineering for Civil Engineering**	CO1:To understand the mechanical equipment for the usage at civil engineering systems.
			CO:2To familiarize with the general principles and requirements for refrigeration, manufactering
			CO:3To realize the techniques employed to construct civil engineering systems
			CO:4To understand the manufacturing process for the usage at civil engineering constructions
			CO:5Learning the design and working process of machine tools for the usage of construction field
12	II/II	**Building Materials Construction and Planning**	CO:1Define the basic terminology that is used in the industry
			CO:2Categorize different building materials, properties and their uses
			CO:3Understand the prevention of damage measures and good workmanship
			CO:4Explain different building services
			CO:5Explain different building plan services

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13	II/II	**Strength of Materials-II**	CO:1Describe the concepts and principles, understand the theory of elasticity, and perform calculations, relative to the strength of mechanical components in particular to torsion and direct compression;
			CO:2To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading
			CO:3Analyze strength and stability of structural members subjected To Direct, and Direct and Bending stresses;
			CO:4Understand and evaluate the shear center and unsymmetrical bending.
			CO:5Frame an idea to design a system, component or process
14	II/II	**Hydraulics and Hydraulic Machinery**	CO:1Apply their knowledge of fluid mechanics in addressing problems in open channels and hydraulic machinery.
			CO:2Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions.
			CO:3Apply dimensional analysis and to differentiate the model, prototype and similitude conditions for practical problems.
			CO:4Get the knowledge on different hydraulic machinery devices and its principles that will be utilized in hydropower development and for other practical usages
			CO:5Students able to know the perfomance of single stage and multistage pumps
15	II/II	**Structural Analysis-I**	CO:1An ability to apply knowledge of mathematics, science, and engineering
			CO:2Analyse the statically indeterminate bars and continuous beams
			CO:3Draw strength behaviour of members for statis and dynamic loading
			CO:4Calculate the stiffness parameters in beams and pin jointed trusses.
			CO:5Understand the indeterminacy aspects to consider for a total structural system
16	II/II	**Computer aided Civil Engineering Drawing**	CO:1Use the Autocad commands for drawing 2D & 3D building drawings required for different civil engg applications.
			CO:2Plan and draw Civil Engineering Buildings as per aspect and orientation.
			CO:3Presenting drawings as per user requirements and preparation of technical report
17	II/II	**Hydraulics and Hydraulic Machinery Lab**	CO:1Describe the basic measurements techniques of fluid mechanics and its appropriate application.
			CO:2Interpret the results obtained in the labaratory for various

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			experiments
			CO:3Discover the practical working of Hydraulic machines different types of Turbines, pumps, and other miscellaneous hydraulic machines
			CO:4Compare the results of analytical models introduced in lecture to the actual behaviour of real fluid flows and draw correct and sustainable conclusions.
			CO:5Write a technical laboratory report
18	II/II	**Basic Electrical and Electronics Engineering Lab**	CO:1To analyze and solve electrical circuits using network laws and theorems.
			CO:2To understand and analyze basic electrical and magnetic circuits
			CO:3To study the working principles of electrical machines
			CO:4To introduce components of low voltage electrical installations
			CO:5To identify and characterize diodes and various types of transistors
19	II/II	**Gender Sensitization Lab**	CO:1Students will have developed a better understanding of important issues related to gender in contemporary India.
			CO:2Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
			CO:3Students will acquire inslight into the gendered division of labour and its relation to politics and economics.
			CO:4Men and women students and professionals will be better equipped to work and live together as equals.
			CO:5Students will develop a scese of appreciation of women in all walks of life
20	III/I	**Structural Analysis-II**	CO:1Analyze the two hinged arches.
			CO:2Solve statically indeterminate beams and portal frames using classical methods
			CO:3Sketch the shear force and bending moment diagrams for indeterminate structures.
			CO:4Formulate the stiffness matrix and analyze the beams by matrix methods

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			CO:5Analyze to know the influence lines for indeterminate structures
21	III/I	**Geotechnical Engineering**	CO:1Characterize and classify the soils
			CO:2Able to estimate seepage, stresses under various loading conditions amd compaction characteristics
			CO:3Able to analyse the compressibility of the soils
			CO:4Able to understand the strength of soils under various drainage conditions
			CO:5Able to know the failure machanism and the shear strength of soils
22	III/I	**Structural Engineering-I (RCC)**	CO:1Compare and design the singly reinforced, doubly reinforced and flanged sections.
			CO:2Design the axially loaded, uniaxial and biaxial bending columns
			CO:3Classify the footings and design the isolated square, rectangular and circular footings
			CO:4Distinguish and design the one-way and two-way slabs.
			CO:5Students able to know the design of footings for different foundations
23	III/I	**Transportation Engineering**	CO:1An ability to apply the knowledge of mathematics, science and engineering in the areas of traffic engineering, highway development and maintenance
			CO:2An ability to design, conduct experiments to assess the suitability of the highway materials like soil, bitumen, aggregates ans a variety of bituminous mixtures. Also the students will develop the ability to interpret the results and assess the suitability of these materials for construction of highways.
			CO:3Ab ability to design flexible and rigid highway pavements for varying traffic compositions as well as soil subgrade and environmental conditions using standards stipulated by Indian Roads Congress.
			CO:4An ability to evaluate the structural and functional conditions of in-service highway pavements and providesolution in the form of routine maintenance measures or designed overlays using Indian Roads congress guidelines
			CO:5An ability to assess the issue related to road traffic and provide engineering solutions supported with anunderstanding of road user psychological and behavioural patterns.

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24	III/I	**Concrete Technology**	CO:1Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting differenttests.
			CO:2Recognize the effects of rheology and early age properties of concrete on its long term behaviour.
			CO:3Apply the use of various chemical admixtures and mineral additives to design cement-based materials with tailor-made properties
			CO:4Use advanced laboratory techniques to characterize cement-based materials.
			CO:5Perform mix design and engineering properties of special concretes such as high-performance concrete, self-compacting concrete, and fibre reinforced concrete.
25	III/I	**Engineering Economics and Accountancy**	CO:1To perform and evaluate present and future worth of the alternate projects and to appraise projects by using traditional and DCF methods.
			CO:2To carry out cost benefit analysis of projects and to calculate BEP of different alternative projects.
26	III/I	**Highway Engineering and Concrete Technology Lab**	CO:1Categorize the test on materials used Civil Engineering Buildings & Pavement constructions
			CO:2To perform the tests on concrete for it characterization
			CO:3To design concrete mix proportioning by using Indian standard method
			CO:4Examine the tests performed for bitumen mixes
			CO:5To prepare a laboratory report
27	III/I	**Geotechnical Engineering Lab**	CO:1At the end of the course, the students will be able to classify and evaluate the behaviour of the soils subjected to various loads.
28	III/I	**Advanced Communication Skills Lab**	CO:1The students will able to use english language both written and spoken
			CO:2The students will able to enrich their comprehension ability and fluency
			CO:3To understand the concept and will gain confidence level in the appearing in the jam, debate role-play

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			CO:4The students will able to develop the study skills and communication skills in formal and informal situations
			CO:5The students will able to improve the language proficiency in English with writing skills also
29	III/I	**Intellectual Property Rights**	CO:1Intellectural property, international organizations, agencies and treaties, importance of intellectual property rights.
			CO:2Purpose and function of trademarks, acquisition of trade mark rights
			CO:3Foundation of patent law, patent searching process, ownership rights and transfer
			CO:4New development of intellectual property: new developments in trade mark law; copy right law,patent law, intellectual property audits
30	III/II	**Hydrology and Water Resource Engineering**	CO:1Understand the different concepts and terms used in engineering hydrology
			CO:2To identify and explain various formulae used in estimation of surface and ground water hydrology components
			CO:3Demonstrate their knowledge to connect hydrology to the field requirement
			CO:4The students will able to know the to increase the ground water table depends upon clainmatic factors
			CO:5To understand and the importance of canal regulation system in irrigation
31	III/II	**Environmental Engineering**	CO:1Asess characteristics of water and wasterwater and their impacts
			CO:2Estimate quantities of water and wasterwater and plan conveyance components
			CO:3Design components of water and waste water treatment plants
			CO:4Be conversant with issues of air pollution and control
			CO:5To understand the concept of various unit operations and design of water treatment systems
32	III/II	**Foundation Engineering**	CO:1Understands the principles and methods of Geotechnical Exploration
			CO:2Decide the suitability of soils and check the stability of slopes
			CO:3Calculate lateral earth pressures and check the stability of retaining walls

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			CO:4Analyse and design the shallow and deep foundations
			CO:5Student will able to analyse and design of well foundations
33	III/II	**Structural Engineering-II (Steel)**	CO:1Analyze the tension members, compression members.
			CO:2Design the tension members, compression members and column bases and joints and connections
			CO:3Analyze and design the beams including built-up sections and beam and connections.
			CO:4Identify and Design the various components of welded plate girder including stiffeners
			CO:5Analyse and design of roof trusses
34	III/II	**Prestressed Concrete**	CO:1Acquire the knowledge of evolution of process of prestressing
			CO:2Acquire the knowledge of various prestressing techniques
			CO:3Develop skills in analysis design of prestressed structural elements as per the IS codai provisions
			CO:4To develop transformation of stresses in pretensioned members
			CO:5Students will able to know the composite beams and deflections
35	III/II	**Environmental Engineering Lab**	CO:1Understand about the equipment used to conduct the test procedures
			CO:2Perform the experiments in the lab
			CO:3Examine and Estimate water waste water,air and soil Quality
			CO:4Compare the water, air quality standards with prescribed standards set by the local governments
			CO:5Develop a report on the quality aspect of the environment
36	III/II	**Computer Aided Design Lab**	CO:1Model the geometry of real-world structure represent the physical model of structural element /structure
			CO:2Perform analysis
			CO:3Design the structural elements and a system as per IS Codes
			CO:4Interpret from the post processing results
37	III/II	**Environmental Science**	CO:1Get the knowledge about the differents types of resources like land, water, mineral and energy and also about the effects of

			environments by the usage of these resoureces
			CO:2Get the information about ecosystem and also about its functions like food chain Ecological pyramids etc
			CO:3Gain the knowledge about the ecosystem diversity its values and also about the importance of the endemic species and differtent techniques involved in its conservation
			CO:4Gain the knowledge about the different types of pollutions and their control tchnologies, Waste water treatment , Bio medical waste management etc
			CO:5Get the complete information about EIA-Environmental Impact Assassement ,Sustainable developmental activities , enviromental policies and regulations awarewness amoung people
38	III/II	**Advanced Structural Analysis**	CO:1Analyze the multistory building frames by various approximate methods
			CO:2Solve the continuous beams portal frames by matrix methods of analysis
			CO:3Analyze and design of large frames with or without shear walls
			CO:4Analyze and design plane truss continous beams
			CO:5\students will able to know the structural behavious of large frames
39	IV/I	**Transportation Engineering-II**	CO:1Understand Plan highway networks
			CO:2Design highway gecometrics
			CO:3Design Intersections and prepare traffic management plans.
			CO:4Design flexiable and rigid pavements
			CO:5An ability to assess the issue related to road traffic and provide engineering solutions supported with anunderstanding of road user psychological and behavioural patterns.
40	IV/I	**Estimation Quantity Surveying and Valuation**	CO:1Understand the technical specifications for various works to be performed for a project
			CO:2Quantify the worth of a structure by evaluating the quantitites of constituenties , derieve their cost rates
			CO:3Understand how compitetive bidding works and how to

			submit a bidding proposal
			CO:4An idea of how to optimize consturction projects based on costs
			CO:5An ability to put forward ideas and understandings to others with effective communication processes
41	IV/I	**Ground Improvement Techniques**	CO 1 Identify the purpose of ground improvement techniques to obtain the suitable construction site for long-lasting structures.
			CO 2 List the problematic soils and its characteristics to select the suitable method for ground improvement.
			CO 3 Illustrate the various methods of ground improvement techniques to increase load bearing capacity of beneath and surface soils
			CO 4 Apply the methods of physical, chemical, mechanical and hydraulic for obtaining void less soils
			CO 5 Explain the various grouting techniques and its applications for improving loadbearing of beneath soils
42	IV/I	**Traffic Engineering**	CO:1Understand basics principal of Traffic Engineering
			CO:2Analyze parking data and model accidents
			CO:3Determine capacity and LOS.
			CO:4To provide engineering techniques to achieve safe and efficient movement of people and goods on roadways
			CO:5Students will able to know deal with traffic issues including safety planning design operation and control
43	IV/I	**Utilization of Electrical Energy**	CO:1Able to maintain electric drives used in an industries
			CO:2Able to identify a heating/ welding scheme for a given application
			CO:3Able to maintain/ Trouble shoot various lamps and fittings in use
			CO:4Able to figure-out the different schemes of traction schemes and its main components
			CO:5Able to design a suitable scheme of speed control for the tractiuon systems
			CO:6Able to identify the job/higher education / research opportunities in Electric Utilization industry
44	IV/I	**Airports, Railways and Waterways**	CO:1At the end of this course, the students will develop:
			CO:2An ability to design of runways and taxiways.
			CO:3An ability to design the infrastructure for large and small airports

			CO:4An ability to design various crossings and signals in Railway Projects.
			CO:5An ability plan the harbors and ports projects including the infrastructure required for new ports and harbors.
45	IV/I	**Non-Conventional Energy Sources**	CO:1Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells.
			CO:2Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation.
			CO:3Explore the concepts involved in wind energy conversion system by studying its components, types and performance
			CO:4 Illustrate ocean energy and explain the operational methods of their utilization
			CO:5Acquire the knowledge on Geothermal energy.
46	IV/I	**Ground Water Hydrology**	CO:1 Various components of hydrologic cycle that affect the movement of water in the earth
			CO:2 Various Stream flow measurements technique
			CO:3 the concepts of movement of ground water beneath the earth
			CO:4 the basic requirements of irrigation and various irrigation techniques, requirements of the crops
			CO:5 Distribution systems for canal irrigation and the basics of design of unlined and lined irrigation canals design CO- 6 Basic components of river Training works.
47	IV/I	**Transportation Engineering Lab**	CO:1At the end of the course, the students will be able to Asses for Highway construction properties of highway materials
48	IV/I	**Environmental Engineering Lab**	CO:1The students will develop the knowledge in mathematics science and engineering
			CO:2The students will be able to design and conduct experiments interpret and analyze data and report results
			CO:3The students will demonstrate the ability to design of civil Engineering systems or a process that meets desired specifications and requirements related to all fields of civil Engineering
			CO:4The students will demonstrate the ability to function on engineering and science laboratory teams, asa well as on multidisciplinary design teams

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			CO:5The students will demonstrate the ability to identify, formulate and solve Civil engineering problems
49	IV/I	**Industry Oriented Mini Project**	CO:1Formulate a real world problem and develop its requirements
			CO:2Ability to plan and execute well defined objective
			CO:3Ability to work in team at component level
			CO:4Ability to solve problems on analysis & design
			CO:5Self learn new softwares and /or techniques that contribute to the software solution of the project
50	IV/I	**Seminar**	CO:1The students will be able to recall existing technologies in the area of Designing
			CO:2The students will be to able describe compare and evaluate different technologies
			CO:3The students will be to able decide the area of interst
			CO:4The students will demonstrate the ability to identify, formulate and solve Civil engineering problems
			CO:5The students will be to able to write technical reports
51	IV/II	**Solid Waste Management**	CO:1Identify the physical and chemical composition of wastes
			CO:2Analyze the functional elements for soild waste management
			CO:3Analyze the functional elements for liquid waste management
			CO:4To understand the effluent treatment Plants and its disposal
			CO:5Plan measures for reclamation of saline soils
52	IV/II	**Industrial Waste Water Treatment**	CO:1Identify the characteristics of industrial wastewaters
			CO:2Describe pollution effects of disposal of industrial effluents
			CO:3Identify and design treatment options for industrial wastewater
			CO:4Formulate environmental management plan
			CO:5Suggestion methods for safe disposal of hazardous wasters
53	IV/II	**Pavement Design**	CO:1Characterize the response characteristics of soil, aggregate, asphalt mixes
			CO:2Analyze flexible pavements
			CO:3Analyze rigid pavements
			CO:4Design a flexible pavement using IRC, Asphalt Institute and AASHTO methods
			CO:5Design a rigid pavement using IRC, and AASHTO methods

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54	IV/II	**Major Project**	CO:1Student will able to work in a group as a part of multidisciplinary team with professional responsibility
			CO:2Student will able to Analyse and design of structure to meet desired needs with in realistic constraints
			CO:3Student is capable of doing Review litereture and finalizes problem statement
			CO:4Student can plan activity schedule and implementation in agiven time span
			CO:5Student will be able to prepare and present technical report

Electrical & Electronics Engineering I & II Sem Course outcomes for the Academic year 2022- 2023			
S.No.	**Year/ Sem**	**Course Name**	**Course Outcomes**
1	**I/I**	**Electrical Circuit Analysis –I**	**CO1:** Understand network analysis, techniques using mesh and node analysis.
			CO2: Evaluate steady state and transient behavior of circuits for DC excitations
			CO3: Evaluate steady state and transient behavior of circuits for AC excitations
			CO4: Analyze electric circuits using network theorems
			CO5: Understand concepts of coupled circuits.
2	**I/I**	**Elements Of Electrical And Electronics Engineering**	**CO1:** Verify the basic Electrical circuits through different experiments
			CO2: Evaluate the performance calculations of Electrical Machines
			CO3: Evaluate the performance calculations of Transformers through various testing methods.
			CO4: Analyze the transient responses of RL
			CO5: Analyze the transient responses of RC circuits for different input conditions.
		Electrical Circuit	**CO1:** Observe the response of various R, L and C circuits for

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3	I/II	Analysis – Ii	different excitations.
			CO2: Examine the behavior of Laplace transforms and transfer function of single port network.
			CO3: Obtain two port network parameters and applications
			CO4: Examine the behavior of circuits using Fourier function of single port network.
			CO5: Obtain design of various filters
4	I/II	**Electrical Circuit Analysis Laboratory**	**CO1:** Analyze complex DC circuits
			CO2: Analyze complex AC linear circuits
			CO3: Apply concepts of electrical circuits across engineering
			CO4: Evaluate response of a given network by using theorems.
			CO5: Analyze the two port network
5	II/I	**Numerical Methods And Complex Variables**	**CO1:** Express any periodic function in terms of sine and cosine
			CO2: Find the root of a given polynomial and transcendental equations.
			CO3: Estimate the value for the given data using interpolation
			CO4: Find the numerical solutions for a given first order ODE's
			CO5: Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
6	II/I	**Electrical Machines - I**	**CO1**: Identify different parts of a DC machine & understand its operation
			CO2: Carry out different testing methods to predetermine the efficiency of DC machines
			CO3:. Understand different excitation and starting methods of DC machines
			CO4: Control the voltage and speed of a DC machines
			CO5 Analyze single phase and three phase transformers circuits.
7	II/I	**Power System - I**	**CO1:**Understand the operation of conventional and renewable electrical power generating stations.
			CO2: Evaluate the power tariff methods and Economics associated with power generation
			CO3: Determine the electrical circuit parameters of transmission lines
			CO4: Analyze the operations of AIS & GIS, Insulators
			CO5: Analyze the Distribution systems
	II/I	**Analog Electronic Circuits**	**CO1:** Know the characteristics, utilization of various components.

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8			**CO2:** Understand the biasing techniques
			CO3: Design and analyze various rectifiers, small signal amplifier circuits.
			CO4: Design sinusoidal and non-sinusoidal oscillators.
			CO5: A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linearintegrated circuit
9	II/I	**Electromagnetic Fields**	**CO1:** To understand the basic laws of electromagnetism.
			CO2: To obtain the electric and magnetic fields for simple configurations under static conditions.
			CO3: To analyze time varying electric and magnetic fields.
			CO4: To understand Maxwell's equation in different forms and different media.
			CO5: To understand the propagation of EM waves.
10	II/I	**Electrical Machines Laboratory – I**	**CO1:** Start and control the Different DC Machines
			CO2: Assess the performance of different machines using different testing methods
			CO3: Identify different conditions required to be satisfied for self - excitation of DC Generators.
			CO4: Separate iron losses of DC machines into different components
			CO5: To understand characteristics of d.c generator and motor.
11	II/I	**Analog Electronics Lab**	**CO1:** Know the characteristics, utilization of various components.
			CO2: Understand the biasing techniques
			CO3: Design and analyze various rectifiers, small signal amplifier circuits
			CO4: Design sinusoidal and non-sinusoidal oscillators.
			CO5: A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linear integrated circuits.
12	II/I	**Electrical Simulation Tools Laboratory**	**CO1:** Develop knowledge of software packages to model and program electrical
			CO2: Develop knowledge of software packages to model and program electronics systems.
			CO3: Model different electrical and electronic systems and analyze the results
			CO4: Articulate importance of software packages used for simulation in laboratory experimentation by analyzing the simulation results.

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			CO5: Analyze solar pannels
13	II/II	**Solid Mechanics And Hydraulic Machines**	**CO1:** Solve problems dealing with forces, beam and cable problems and understand distributed force systems.
			CO2: Solve friction problems and determine moments of Inertia and centroid of practical shapes.
			CO3: Apply knowledge of mechanics in addressing problems in hydraulic machinery and its principles that will be utilized in Hydropower development and for other practical usages.
			CO4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatorymotion and rigid body motion.
			CO5: Solve problems using work energy equations for translation, fixed axis rotation and planemotion and solve problems of vibration.
14	II/II	**Measurements And Instrumentation**	**CO1:** Understand different types of measuring instruments, their construction, operation andcharacteristics
			CO2: Identify the instruments suitable for typical measurements
			CO3: Apply the knowledge about transducers and instrument transformers to use them effectively.
			CO4: Apply the knowledge of smart and digital metering for industrial applications
			CO5: Understand Transducers
15	II/II	**Electrical Machines – II**	**CO1:** Understand the concepts of rotating magnetic fields.
			CO2: Understand the operation of ac machines
			CO3: Analyze performance characteristics of ac machines.
			CO4: Understand the parallel operation of synchronous machines
			CO5: Analyse the single phase and special machine
16	II/II	**Digital Electronics**	**CO1:** Understand working of logic families and logic gates.
			CO2: Design and implement Combinational and Sequential logic circuits.
			CO3: Understand the process of Analog to Digital conversion and Digital to Analog conversion

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			CO4: Be able to use PLDs to implement the given logical problem.
17	**II/II**	**Power Systems - Ii**	**CO1:** Analyze transmission line performance.
			CO2: Apply load compensation techniques to control reactive power
			CO3: Understand the application of per unit quantities
			CO4: Design over voltage protection and insulation coordination
			CO5: Determine the fault currents for symmetrical and unbalanced fault
18	**II/II**	**Digital Electronics Lab**	**CO1:** Understand working of logic families and logic gates.
			CO2: Design and implement Combínational and Sequential logic circuits.
			CO3: Understand the process of Analog to Digital conversion and Digital to Analog conversion.
			CO4: Be able to use PLDs to implement the given logical problem.
19	**II/II**	**Measurement And Instrumentation Lab**	**CO1:** to choose instruments
			CO2: test any instrument
			CO3: find the accuracy of any instrument by performing experiment
			CO4: calibrate PMMC instrument using D.C potentiometer
20	**II/II**	**Electrical Machines Laboratory – Ii**	**CO1:** Assess the performance of different machines using different testing methods
			CO2: To convert the Phase from three phase to two phase and vice
			CO3: Compensate the changes in terminal voltages of synchronous generator after estimating the change by different methods
			CO4: Control the active and reactive power flows in synchronous machines
			CO5: Start different machines and control the speed and power factor

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Electronics and communication Engineering I & II Sem Course Outcomes For The A.Y. 2022-2023			
S.No.	**Year/ Sem**	**Course Name**	**Course Outcomes**
1	**II/I**	**Electronics Devices &Circuits**	**CO1:** Analyze the applications of the p-n diode as rectifier and Zener diode as voltage regulator
			CO2: Analyze the characteristics of BJT in CB, CE and CC configurations
			CO3: Design and analyze the transistor biasing circuits for a given operating point
			CO4: Design and analyze amplifiers at low frequencies using h parameter model
			CO5: Analyze FET and MOSFET amplifiers at low frequencies
2	**II/I**	**Network Analysis & Transmissio n Theory**	**CO1:** Gain the knowledge on basic RLC circuits behavior
			CO2: Analyze the Steady state and transient analysis of RLC Circuits.
			CO3: Know the characteristics of two port network parameters
			CO4: Analyze the transmission line parameters and configurations
			CO5: Integrate the wave propagation through transmission lines and compute the smith chart and impedance matching the device
3	**II/I**	**Digital System Design.**	**CO1**: Understand the numerical information in different forms and Boolean Algebra theorems.
			CO2: Understand Postulates of Boolean algebra and to minimize combinational functions.
			CO3: Design and Analyze combinational and sequential circuits.
			CO4: Analyse and solve varies engineering problems with FSM
			CO5: Know about the logic families and realization of logic gates.
4	**II/I**	**Signals and Systems**	**CO1:** Defining the various signals and identifying the signal functions& relations
			CO2: Represent any arbitrary signal in time and frequency domain.
			CO3: Understand the characteristics of linear time invariant systems.
			CO4: Analyze the signals with different transform technique
			CO5: Use sampling theorem for base band and band pass signals for various type of sampling and correlation
5	**II/I**	**Probability Theory and Stochastic Process**	**CO1:** Understand probabilities and able to solve using an appropriate sample space
			CO2: Compute various operations like expectations from probability density functions (pdfs) and probability distribution functions
			CO3: Understand the concept of random process, differentiate between stochastic and ergodic processes
			CO4: Understand Auto-correlation and cross correlation properties between two random variables
			CO5: To apply the concepts of noise and information theory in communication systems

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6	II/I	**Electronics Devices &Circuits Lab**	**CO1:** Analyze the characteristics of p-n junction diode and Zener diode and calculate the dynamic and static resistance in forward bias and reverse bias respectively
			CO2: Calculate the ripple factor and efficiency of Half Wave and Full wave rectifiers with and without filters.
			CO3: Analyze the characteristics of BJT in Common Emitter and Common Base configurations and calculate the corresponding h-parameters
			CO4: Analyze the characteristics of FET in Common Source configuration and calculate the gm and rd. CO 5 Calculate Bandwidth of BJT/FET amplifier from its frequency response.
			CO5: Obtain the characteristics of UJT and SC
7	II/I	**Digital System Design Lab**	**CO1:** Implement Boolean Expressions using universal logic gates .
			CO2: Design and verify Combinational logic circuits using IC's .
			CO3: Design and verify Sequential logic circuits using IC's
			CO4: Implement Counters & Shift registers using FF's
			CO5: Design and realization of sequence detector using FSM
8	II/I	**Basic Simulation Lab**	**CO1:** Synthesize a given waveform using standard test signals and sequences.
			CO2: Analyze the effect of various transformations applied on independent and dependent variables of a signal.
			CO3: Determine the symmetry (even/odd) of signals /sequences.
			CO4: Classify a system based on its characteristics and find its response for various excitations.
			CO5: Convert time domain signal into frequency domain using Fourier transform and plot its magnitude and phase spectrum.
9	II/I	**Constitution of India**	**CO1:** Historical perspective of the Constitution of India
			CO2: Fundamental Duties and its legal status .
			CO3: Federal structure and distribution of legislative and financial powers between the Union and the States
			CO4: The historical perspectives of the constitutional amendments in India
			CO5: Scope of the Right to Life and Personal Liberty

10	II/II	**Laplace Transforms, Numerical Methods & Complex Variables**	**CO1:** understand the Laplace transforms techniques for solving ode's
			CO2: find the root of a given equation.
			CO3: calculate the value for the given data using interpolation
			CO4: analyze the numerical solutions for a given ode's
			CO5: analyze the complex function with reference to their analyticity, integration using cauchy'sintegral, residue theorems and understand taylor's and laurent's series
11	II/II	**Electromagnetic Fields and Waves**	**CO1:** Get the knowledge of Basic Laws, Concepts and proofs related to Electrostatic Fields
			CO2: Acquire the knowledge of basic law's concepts andproofs related to Magnetostatic Fields
			CO3: Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions.
			CO4: Analyze the Wave Equations for good conductors, good dielectrics and evaluate the UPW Characteristics for several practical media of interest.
			CO5: To analyze completely the rectangular waveguides, their mode characteristics, and design waveguides for solving practical problems
12	II/II	**Analog and Digital Communications**	**CO1::**Analyze and design of various continuous wave and angle modulation and demodulation techniques
			CO2: Understand the effect of noise present in continuous wave and angle modulation techniques.
			CO3: Attain the knowledge about AM , FM Transmitters and Receivers
			CO4: Analyze and design the various Pulse Modulation Techniques.
			CO5: Understand the concepts of Digital Modulation Techniques and Baseband transmission
13	II/II	**Linear IC Applications**	**CO1:** Understand the internal operation of Op-Amp and its specifications.
			CO2: Analyze and design linear applications like adder, substractor, instrumentation amplifierand etc. using Op-Amp.
			CO3: Analyze and design nonlinear applications like multiplier, comparator and etc, using Op-Amp.
			CO4: Attain the knowledge of functional diagrams and applications of IC 555 and IC565 and applications
			CO5: Acquire the knowledge about the Data converters.
14	II/II	**Electronic Circuit**	**CO1:** Analyze single stage amplifiers at Mid-band, Low frequency and High frequency regions

		Analysis	**CO2:** Analyze multistage amplifiers at Mid-band, Low frequency and High frequency regions.
			CO3: Design and analyze different types of feedback amplifiers and oscillators using transistors
			CO4: Analyze different types of power amplifiers and compare them in terms of efficiency.
			CO5: Analyze tuned amplifiers and the effects of cascading tuned amplifiers
1	**II/II**	**Analog and Digital Communications Lab**	**CO1:**Analyze the spectrum of various analog modulation techniques
			CO2: Design a multiplexing system using FDM
			CO3: Examine various pulse modulation Techniques
			CO4: Analyze different digital modulation and demodulation
			CO5: Design Digital Modulation Techniques (FSK,PSK.BPSK)
16	**II/II.**	**IC Applications Lab**	**CO1:**Design analog circuits for practical applications using Op Amp IC-741
			CO2: Design and perform various mathematical operations like adder and subtrac IC.s
			CO3: Design waveform generators and PLL circuits using ICs
			CO4: Design multi vibrators using IC555 and Schmitt trigger using IC741
			CO5: Analyze the practical applications of Voltage Regulator using various ICs.
17	**II/II**	**Electronic Circuits Analysis Lab**	**CO1:**Design, simulate and verify basic amplifier circuits
			CO2: Design, simulate and verify feedback amplifiers
			CO3: Design, simulate and verify oscillators.
			CO4:. Design, simulate and verify power amplifier circuits
			CO5: Design, simulate and verify Multivibrators and Sweep Circuits
18	**II/II**	**Gender Sensitization Lab**	**CO1:**Develop a better understanding of important issues related to gender in contemporary India.
			CO2: Analyze basic dimensions of the biological, sociological, psychological and legal aspects of gender.
			CO3: Develop a sense of appreciation of women in all walks of life and will be equipped to work and live together as equals.
			CO4: Examine the new laws for women protection & relief, and empower students to understand and respond to gender violence
			CO5: Students will develop a sense of appreciation of women in all walks of life
19	**III/I**	**Microprocessors & Microcontro**	**CO1**: Understands the internal architecture, organization and assembly language programming of 8086 processors.

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		llers	**CO2:** Understands the internal architecture, organization and assembly language programming of 8051/controllers
			CO3: Understands the interfacing techniques to 8086 and 8051 based systems.
			CO4: Understands the internal architecture of ARM processors and basic concepts of advanced ARM processors.
			CO5: Classify the CORTEX and OMAP Processors
20	**III/I**	**Data Communications and Networks**	**CO1:**Analyze the Categories and functions of various Data communication Networks
			CO2: Design and analyze various error detection techniques
			CO3: Demonstrate the mechanism of routing the data in network layer
			CO4: Analyze the significance of various Flow control and Congestion control Mechanisms
			CO5: Analyze the Functioning of various Application layer Protocols.
21	**III/I**	**Control Systems**	**CO1:** Explain different ways of system representations such as Transfer function CO2: Apply various time domain and frequency domain techniques to assess the system performance
			CO3: Apply various control strategies to different applications like power systems, electrical drives etc
			CO4: Design various controllers and compensators to improve system performance
			CO5: Construct the State models for continuous & discrete time systems and comment on controllability and Observability of the system
22	**III/I**	**Business Economics & Financial Analysis**	**CO1:**Understand the various forms of business
			CO2:contrast of demand and supply
			CO3:change production, cost market structures and pricing
			CO4:study the firm's financial position
			CO5: Relate to analyze the financial statements of a company
23	**III/I**	**Electronic Measurements and Instrumentation**	**CO1:** Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
			CO2: Measure various physical parameters by appropriately selecting the transducers.

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			CO3: Use various types of signal generators, signal analyzers for generating and analyzing Various real-time signals.
			CO4: Explain functioning, specification and applications of signal generators, signal analyzers for generating and analyzing various real-time signals.
			CO5: Design of various bridges and measurement of physical parameters
24	**III/I**	**Microprocessors & Microcontrollers Lab**	**CO1:** Write programs in assembly language using the instruction set of 8086 through MASM software as well as using 8086 Kit.
			CO2: Interface different I/O devices with 8086 and establish communication between them.
			CO3: Write programs in assembly language using instruction set of 8051 and execute the same.
			CO4: Verify the operations of the timer, counter and serial port (UART) of 8051.
			CO5: Design etectrical circuitry to the microcontroller i/o ports in order to interface the external devices
25	**III/I**	**Data Communications and Networks Lab**	**CO1:**Create and evaluate the performance of various LAN topologies
			CO2: Evaluate the performance of queue management, scheduling mechanisms and protocols
			CO3: Evaluate the performance of routing protocols and IEEE 802.x standards
			CO4: Analyze various protocols using packet capture monitoring tools.
			CO5: Analysis of HTTP,DNS and DHCP Protocols
26	**III/I**	**Advanced Communication Skills Lab**	**CO1:**Build sound vocabulary and use functional English effectively
			CO2: Analyze the given text and respond appropriately and develop efficacious writing skills
			CO3: Develop effective speaking skills and maximize job prospects
			CO4: Plan and make different forms of presentation using various techniques.

			CO5: To communicate their ideas relevantly and coherently in writing.
27	**III/II**	**Antennas and Wave Propagation**	**CO1:** Explain radiation mechanism and various parameters of an antenna.
			CO2: Design Loop, Helical, Horn and Yagi–Uda antennas.
			CO3: Explain the working principle of Microstrip, Reflector and Lens antennas.
			CO4:. Design different types of arrays and explain the test procedures involved in Antenna Measurements.
			CO5: Explain the mechanisms of wave propagation and atmospheric effects on radio wave propagation
28	**III/II**	**Digital Signal Processing**	**CO1:** Understand the LTI system characteristics and Multirate signal processing
			CO2: Understand the inter-relationship between DFT and various transforms
			CO3: Design a digital filter for a given specification.
			CO4: Understand the significance of various filter structures and effects of round off errors
			CO5: To understand the fast computation of DFT and appreciate the FFT processing
29	**III/II**	**VLSI Design**	**CO1:** Explain MOS technology of NMOS, PMOS, CMOS and BiCMOS.
			CO2: Design stick diagrams and draw the layout of a logic circuit
			CO3: Analyze the architectural issues involved in subsystem design.
			CO4:. Design building blocks of data path subsystems and analyze simple memories using MOS transistors.
			CO5: Apply concepts of VLSI design methodology and explain the test principles
30	**III/II**	**Embedded System Design**	**CO1:** To understand the selection procedure of Processors in the embedded domain
			CO2: Design Procedure for Embedded Firmware.
			CO3: To visualize the role of Real time Operating Systems in Embedded Systems.
			CO4: To evaluate the Correlation between task synchronization and latency issues.
			CO5: To understand the necessity of operating systems in correlation with hardware systems.
31	**III/II**	**Disaster Preparednes**	**CO1:** Make managerial decisions for effective business administration.

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			CO3: Analyze the characteristics of O-type and M-type microwave tubes
			CO4: Estimate S-parameters of multiport junction devices
			CO5 Understand the mechanism of light propagation through Optical Fibers
36	**IV/I**	**Digital Image Processing**	**CO1**:Remember Upon completing this course, the student will be able to Explore the fundamental relations between pixels
			CO2: Understand utility of 2-D transforms in image
			CO3: Apply processer the enhancement, segmentation
			CO4: Analyze restoration processes on an image.
			CO5: Evaluate Implement the various Morphological operations on an image
37	**IV/I**	**Network Security and Cryptography**	**CO1:** Describe network security fundamental concepts and principles
			CO2: Encrypt and decrypt messages using block ciphers and network security technology and protocols
			CO3: Analyze key agreement algorithms to identify their weaknesses
			CO4: Identify and assess different types of threats, malware, spyware, viruses, vulnerabilitie
			CO5: Analyze about Key Management. Web Security
38	**IV/I**	**Java Programming**	**CO1:** Develop Programs with reusability.
			CO2: Develop programs to handle multitasking
			CO3: Develop programs to handle exceptions.
			CO4: Develop applications for a range of problems using object-oriented programming techniques.
			CO5: Design simple Graphical User Interface applications.
39	**IV/I**	**Professional Practice, Law & Ethics**	**CO1**:understand the importance of professional practice and Law Ethics
			CO2: Define the law of contract and its key elements of valid contract

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		s planning Management	CO2: Explore various methods of work study and evaluate standard time
			CO3: Design various types of workspaces.
			CO4: Explain and implement various job evaluation methods.
			CO5: Evaluate the overall cost of production for a product.
32	III/II	Digital Signal Processing Lab	CO1:Generate sinusoidal and noise waveforms using different approaches
			CO2:Analyze Impulse and frequency response of various digital filters.
			CO3:Verify different algorithms of DSP through simulation
			CO4:Implement various DSP algorithms in hardware.
			CO5:Compute multirate digital signal processing
33	III/II	e-CAD Lab	CO1: Verify the functionality of digital circuits using Xilinx ISIM simulator
			CO2: Implement digital circuits on various FPGA boards using Xilinx tools
			CO3:Design layout for digital circuits and perform physical verification
			CO4: Analyze static timing, IR drop and crosstalk in digital circuit layouts
			CO5:Finite State machine design
34	III/II	Scripting Languages Lab	CO1:Design and test programs to solve mathematical problems
			CO2:Develop programs Using Ruby Script
			CO3:Develop Programs Using TCL Script
			CO4:Develop Programs Using Perl Script
			CO5:To understand the perl script to substitute a word with another word in a string
35	IV/I	Microwave and Optical Communications	CO1: Analyze various modes of microwave transmission lines.
			CO2: Examine various waveguide components and their applications.

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			CO3:judge arbitration and conciliation and alternative Dispute resolution
			CO4: Explain the students rights and Responsibility as an Employee
			CO5: Create the need of compression and evaluation of basic compression algorithms.
40	**IV/I**	**Microwave and Optical Communications Lab**	**CO1:**Analyzethecharacteristicsofmicrowave sources and devices.
			CO2: Measure different parameters of various microwave devices.
			CO3: Measure the Scattering Parameters of various Tee Junctions
			CO4: Characterization of LEDs and LASER Diode
			CO5: To measure the numerical Aperture of Fiber Cable and to measure losses for optical link
41	**IV/I**	**Seminor**	**CO1:**Identify emerging topic specific to the programmer
			CO2: Extract the information relevant to the chosen topic.
			CO3: Deliver the knowledge using multimedia
			CO4: Answer the queries with appropriate explanation and elaboration.
			CO5: To evaluate the skills which is required for the topic
42	**IV/1**	**Project Stage - I**	**CO1:**Identify problem, conduct relevant literature survey and formalize it.
			CO2: Analyze & design efficient, cost-effective and eco-friendly solutions using relevant tools (if necessary) and processes
			CO3: Implement the design and demonstrate the functionality of developed model
			CO4: Evaluate the results to derive the conclusion and provide scope for future enhancement.
			CO5: Develop project report presentation skills
43	**IV/11**	**Wireless Sensor Networks**	**CO1:** Describe the overview of wireless sensor networks and enabling technologies for wireless sensor networks
			CO2: Apply the design principles of WSN architectures and operating systems for simulating environment situations
			CO3: Apply various concepts for assignment of MAC addresses..

			CO4: Select the appropriate infrastructure, topology, joint routing and information aggregation for wireless sensor networks
			CO5: Analyze the sensor network platform and tools state-centric programming..
44	**IV/11**	**System on Chip Architecture**	**CO1:** Remember SOC Architectural features.
			CO2: Understand to acquire the knowledge on processor selection criteria and limitations
			CO3: Apply to acquire the knowledge on processor selection limitations
			CO4: Analyze to acquires the knowledge of memory architectures on SOC.
			CO5: Evaluate to the interconnection strategies on SOC.
45	**IV/11**	**Non Conventional Sources of Energy**	**CO1:** Describe the Importance of Renewable Energy sources such as solar, wind, biomass
			CO2: Compare various renewable energy sources. And Identify applications of different renewable energy sources.
			CO3: Demonstrate the schematics of renewable energy systems.
			CO4: Analyse and evaluate the implication of renewable energy. Concepts in solving numerical problems pertaining to solar radiation geometry and wind energy systems.
			CO5: Develop self -learning capability to design & establish renewable energy systems.
46	**IV/11**	**Project Stage – II**	**CO1:**Identify problem, conduct relevant literature survey and formalize it.
			CO2: Analyze & design efficient, cost-effective and eco-friendly solutions using relevant tools (if necessary) and processes
			CO3: Implement the design and demonstrate the functionality of developed model
			CO4: Evaluate the results to derive the conclusion and provide scope for future enhancement.

CSE I & II Sem Course Outcomes For The Academic Year 2022-2023

S.No.	Year/Sem	Course Name	Course Outcomes
1	**II/I**	**Discrete Mathematics**	**CO1:** Ability to understand and construct precise mathematical proofs.
			CO2: Ability to use logic and set theory to formulate precise statements
			CO3: Ability to analyze and solve counting problems on finite and discrete structures
			CO4: Ability to describe and manipulate sequences
			CO5: Ability to apply graph theory in solving computing problems
			CO1: Ability to select the data structures that efficiently model the information in a problem
			CO2: Ability to assess efficiency trade-offs among different data structure

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2	II/I	Data Structures	implementations or combinations.
			CO3: Implement and know the application of algorithms for sorting and pattern matching.
			CO4: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
			CO5: Implement different data structure implementations or combinations.
3	II/I	Mathematical And Statistical Foundations	**CO1:** Apply the number theory concepts to cryptography domain
			CO2: Apply the concepts of probability and distributions to some case studies
			CO3: Correlate the material of one unit to the material in other units
			CO4: Resolve the potential misconceptions and hazards in each topic of study.
			CO5: Implement probability and distributions.
4	II/I	Computer Organization And Architecture	**CO1:** Understand the basics of instructions sets and their impact on processor design.
			CO2: Demonstrate an understanding of the design of the functional units of a digital computer system
			CO3: Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
			CO4: Design a pipeline for consistent execution of instructions with minimum hazards.
			CO5: Recognize and manipulate representations of numbers stored in digital computers
5	II/I	Python Programming	**CO1:** Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
			CO2: Demonstrate proficiency in handling Strings and File Systems
			CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
			CO4: Interpret the concepts of Object-Oriented Programming as used in Python.
			CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
6	II/I	Business Economics And Financial Analysis	**CO1:** The students will understand the various Forms of Business and the impact of economic variables on the Business.
			CO2: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
			CO3: The Students can study the firm's financial position by analysing the Financial Statements of a Company.
			CO4: Implement Production, Cost, Market Structure, Pricing aspects are learnt
			CO5: The Students can study the financial position by analysing the Financial Statements of a Company.
7			**CO1:** Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions,

	II/I	Data Structures lab	pointers and strings, and data structures like stacks, queues and linked lists.
			CO2: Ability to Implement searching and sorting algorithms
			CO3: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
			CO4: Implement different data structure implementations or combinations.
			CO5: Implement different data structure implementations or combinations.
8	II/II	Formal Languages And Automata Theory	**CO1:** Able to understand the concept of abstract machines and their power to recognize the languages
			CO2: Able to employ finite state machines for modeling and solving computing problems.
			CO3: Able to design context free grammars for formal languages
			CO4: Able to distinguish between decidability and undecidability.
			CO5: Able to gain proficiency with mathematical tools and formal methods.
9	II/II	Software Engineering	**CO1:** Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
			CO2: Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
			CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
			CO4: Ablility to structure the requirements in a Software Requirements Document (SRD).
			CO5: Design of a system and be able to critically compare alternative choices
10	II/II	Operating Systems	**CO1:** Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
			CO2: Introduce the issues to be considered in the design and development of operating system
			CO3: Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix
			CO4: Will be able to control access to a computer and the files that may be shared
			CO5: Demonstrate the knowledge of the components of computer and their respective roles in computing
11	II/II	Database Management Systems	**CO1:** Gain knowledge of fundamentals of DBMS, database design and normal forms
			CO2: Master the basics of SQL for retrieval and management of data.
			CO3: Be acquainted with the basics of transaction processing and concurrency control.
			CO4: Familiarity with database storage structures and access techniques

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			CO5: Design the Entity Relationship.
12	**II/II**	**Object Oriented Programming Using JAVA**	**CO1:** Able to solve real world problems using OOP techniques.
			CO2: Able to understand the use of abstract classes
			CO3: Able to solve problems using java collection framework and I/o classes.
			CO4: Able to develop multithreaded applications with synchronization.
			CO5: Able to develop applets for web applications
13	**II/II**	**Object Oriented Programming Using JAVA**	**CO1:** Able to solve real world problems using OOP techniques.
			CO2: Able to understand the use of abstract classes
			CO3: Able to solve problems using java collection framework and I/o classes.
			CO4: Able to develop multithreaded applications with synchronization.
			CO5: Able to develop applets for web applications
14	**II/II**	**DBMS Lab**	**CO1:** Design database schema for a given application and apply normalization
			CO2 Acquire skills in using SQL commands for data definition and data manipulation.
			CO3: Develop solutions for database applications using procedures, cursors and triggers
			CO4: Familiarity with database storage structures and access techniques
			CO5: Design the Entity Relationship.
15	**II/II**	**JAVA Lab**	**CO1**:Able to write programs for solving real world problems using java collection frame work
			CO2: Able to write programs using abstract classes.
			CO3: Able to write multithreaded programs
			CO4: Able to write GUI programs using swing controls in Java.
			CO5: Able to develop applets for web applications
16	**II/II**	**OS Lab**	**CO1:** te and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
			CO2: Able to implement C programs using Unix system calls
			CO3: Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix
			CO4: Will be able to control access to a computer and the files that may be shared
			CO5: Demonstrate the knowledge of the components of computer and their respective roles in computing

17	**III/I**	**Computer Networks**	**CO1:** Gain the knowledge of the basic computer network technology
			CO2: Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model
			CO3: Obtain the skills of sub netting and routing mechanisms
			CO4: Familiarity with the essential protocols of computer networks, and how they can be applied innetwork design and implementation.
18			**CO1:** Ability to translate end-user requirements into system and software requirements, using e.g.UML, and structure the

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	III/I	**Software Engineering**	requirements in a Software Requirements Document (SRD).
			CO2: Identify and apply appropriate software architectures and patterns to carry out high level designof a system and be able to critically compare alternative choices.
			CO3: Will have experience and/or awareness of testing problems and will be able to develop a simpletesting report
19	**III/I**	**Web Technologies**	**CO1**: gain knowledge of client-side scripting, validation of forms and AJAX programming
			CO2: understand server-side scripting with PHP language
			CO3: understand what is XML and how to parse and use XML Data with Java
			CO4: To introduce Server-side programming with Java Servlets and JSP
20	**III/I**	**Principles Of Programming Languages**	**CO1:** Acquire the skills for expressing syntax and semantics in formal notation
			CO2: Identify and apply a suitable programming paradigm for a given computing application
			CO3: Gain knowledge of and able to compare the features of various programming languages
			CO4: Combine the constructs of programming structures with efficiently using oops, concurrency management and event handling
			CO5: Demonstrate the working of functional and logic programming language
21	**III/I**	**Formal languages & Automate theory**	**CO1:** Able to understand the concept of abstract machines and their power to recognize thelanguages
			CO2: Able to employ finite state machines for modeling and solving computing problems
			CO3: Able to design context free grammars for formal languages
			CO4: Able to distinguish between decidability and undecidability.
			CO5: Able to gain proficiency with mathematical tools and formal methods.
22	**III/I**	**Information Retrieval Systems**	**CO1:**Ability to apply IR principles to locate relevant information large collections of data
			CO2: Ability to design different document clustering algorithms
			CO3: Implement retrieval systems for web search tasks.
			CO4: Design an Information Retrieval System for web search tasks
23	**III/I**	**Software Engineering Lab**	**CO1:** Ability to translate end-user requirements into system and software requirements
			CO2: Ability to generate a high-level design of the system from the software requirements
			CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
24	**III/I**	**CN&WT Lab**	**CO1**: Implement data link layer farming methods
			CO2: Analyze error detection and error correction codes.

			23CO3: Implement and analyze routing and congestion issues in network design.
			CO4: Implement Encoding and Decoding techniques used in presentation layer
			CO5: To be able to work with different network tools
25	**IV/I**	**Data Mining**	**CO1:** Ability to understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
			CO2: Apply preprocessing methods for any given raw data.
			CO3: Extract interesting patterns from large amounts of data.
			CO4: Discover the role played by data mining in various fields
			CO5: Choose and employ suitable data mining algorithms to build analytical applications
			CO6: Evaluate the accuracy of supervised and unsupervised models and algorithms
26	**IV-1**	**Cloud Computing**	**CO1:**Ability to understand various service delivery models of a cloud computing architecture
			CO2: Ability to understand the ways in which the cloud can be programmed and deployed.
			CO3: Understanding cloud service providers.
27	**IV-I**	**Software Process & Project Management**	**CO1:** Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation
			CO2: Analyze the major and minor milestones, artifacts and metrics from management and technicalperspective
			CO3: Design and develop software product using conventional and modern principles of softwareproject management
28	**IV-I**	**Cryptography and Network Security**	**CO1:** Student will be able to understand basic cryptographic algorithms, message and webauthentication and security issues
			CO2: Ability to identify information system requirements for both of them such as client and server
			CO3: Ability to understand the current legal issues towards information security
			CO4: Understand and apply the Cryptographic algorithms to Safeguard from Intruders
			CO5: Design a network security system that implement the encryption and decryption algorithms
29	**IV-I**	**Principles of**	**CO1:** Understand the concept of management, organization, planning, staffing.
			CO2: Understand the importance of Direction and controlling, leadership styles, Communication, Coordination and Controlling.

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		Entrepreneurs hip	**CO3:** Understand the role of entrepreneurs in economic development, and barriers, Identification of business opportunities, feasibility studies.
			CO4: Understand the contents of project report, ERP and project.
			CO5: Understand IPRs and institutional support in entrepreneurship, Case Study of Entrepreneurs.
30	**IV-I**	**Cryptography and Network Security Lab**	**CO1:** Apply the cryptographic algorithms for data communication.
			CO2: Compare the performance of various security algorithms.
			CO3: Apply the Digital signature for secure data transmission.
			CO4: Utilize the different open source tools for network security and analysis.
			CO5: Demonstrate intrusion detection system using network security tool.
31	**IV-I**	**Mini Project**	**CO1:**Enable the Students to undertake short research projects in a team under the direction of members of the faculty
			CO2: To impart skills in preparing detailed report describing the project and results.
			CO3: To enable the students to undertake fabrication work of new experimental set up/devices or develop software packages
			CO4: To effectively communicate by making an oral presentation before an evaluation committee
			CO5: Develop project report preparation skills.
32	**IV-I**	**Seminar**	**CO1:** Identify recent technical topics from interested domains.
			CO2: Acquired the basic skills to for performing literature survey and paper presentation
			CO3: Analyze the applicability of modern software tools and technology.
			CO4: Develop Presentation and Communication skills.
			CO5: Develop Technical report preparation skills.
33	**IV-I**	**Project Stage-I**	**CO1:** Prepare abstract for given project by identifying the requirements and prospective solution.
			CO2: To Develop latest information related to the project from various sources to analyze the project.
			CO3: To Choose the materials for the project as per specifications and efficient test for developing the project.
			CO4: Illustrate effective team work after efficient testing, elaborate the completed task and compile the project.
			CO5: To Prepare a good report of the project as per the guidelines and present to the panel of experts.
34	**IV/II**	**Organizational Behaviour**	**CO1:**The objective of the course is to provide the students with the conceptual framework and the theories underlying Organizational Behaviour.
			CO2: Ability to lead themselves and others in the achievement of organizational goals,contributing effectively to a team environment
			CO3: Foster and enhance employability skills through subject knowledge.
			CO4: Equipped with skills and competencies to become an entrepreneur.
			CO5: Ability to develop value based leadership abilities

35	IV/II	Total Quality Management	**CO 1:**To realize the importance of significance of quality.
			CO2: Manage quality improvement teams.
			CO3: Identify requirements of quality improvement programs.
			CO4: Given the defective item analysis (type of defect, frequency, number of defects), the student manager will be able to draw and justify the Pareto chart to prioritize the defects.
			CO5:, the student manager will be able to enlist and justify the four levels of benchmarking and/ or enlist and brief seven step benchmarking model.
36	IV-II	Cyber Forensics	**CO1:**A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
			CO2: In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime.
			CO3: According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.
			CO4: To learn, analyze and validate Forensics Data
			CO5: To study the tools and tactics associated with Cyber Forensics
37	IV-II	project stage-II	**CO1:**Prepare abstract for given project by identifying the requirements and prospective solution.
			CO2: To Develop latest information related to the project from various sources to analyze the project.
			CO3: To Choose the materials for the project as per specifications and efficient test for developing the project.
			CO4: Illustrate effective team work after efficient testing, elaborate the completed task and compile the project.
			CO5: To Prepare a good report of the project as per the guidelines and present to the panel of experts.
CSM I & II Sem Course Outcomes For The Academic Year 2022-2023			
1	II/I	Discrete Mathematics	**CO1:** Ability to understand and construct precise mathematical proofs.
			CO2: Ability to use logic and set theory to formulate precise statements
			CO3: Ability to use logic and set theory to formulate precise statements
			CO4: Ability to describe and manipulate sequences
			CO5: Ability to apply graph theory in solving computing problems
2	II/I	Data Structures	**CO1:** Ability to select the data structures that efficiently model the information in a problem.
			CO2: Ability to assess efficiency trade-offs among different data structure implementations or combinations.
			CO3: Implement and know the application of algorithms for sorting and pattern matching.
			CO4: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
			CO5: Implement different data structure implementations or combinations.

3	II/I	**Mathematical And Statistical Foundations**	**CO1:** Apply the number theory concepts to cryptography domain
			CO2: Apply the concepts of probability and distributions to some case studies
			CO3: Correlate the material of one unit to the material in other units
			CO4: Resolve the potential misconceptions and hazards in each topic of study.
			CO5: Implement probability and distributions.
4	II/I	**Computer Organization And Architecture**	**CO1:** Understand the basics of instructions sets and their impact on processor design.
			CO2: Demonstrate an understanding of the design of the functional units of a digital computer system
			CO3: Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
			CO4: Design a pipeline for consistent execution of instructions with minimum hazards.
			CO5: Recognize and manipulate representations of numbers stored in digital computers
5	II/I	**Python Programming**	**CO1:** Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
			CO2: Demonstrate proficiency in handling Strings and File Systems
			CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
			CO4: Interpret the concepts of Object-Oriented Programming as used in Python.
			CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
6	II/I	**Business Economics And Financial Analysis**	**CO1:** The students will understand the various Forms of Business and the impact of economic variables on the Business.
			CO2: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
			CO3: The Students can study the firm's financial position by analysing the Financial Statements of a Company.
			CO4: Implement Production, Cost, Market Structure, Pricing aspects are learnt
			CO5: The Students can study the financial position by analysing the Financial Statements of a Company.
7	II/I	**Data Structures lab**	**CO1:** Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
			CO2: Ability to Implement searching and sorting algorithms
			CO3: Implement and know the application of algorithms for sorting and pattern matching.
			CO4: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

			CO5: Implement different data structure implementations or combinations.
8	**II/II**	**Formal Languages And Automata Theory**	**CO1:** Able to understand the concept of abstract machines and their power to recognize the languages
			CO2: Able to employ finite state machines for modeling and solving computing problems.
			CO3: Able to design context free grammars for formal languages
			CO4: Able to distinguish between decidability and undecidability.
			CO5: Able to gain proficiency with mathematical tools and formal methods.
9	**II/II**	**Software Engineering**	**CO1:** Will be able to control access to a computer and the files that may be shared
			CO2: Demonstrate the knowledge of the components of computers and their respective roles in computing
			CO3: Ability to recognize and resolve user problems with standard operating environments.
			CO4: Ablility to structure the requirements in a Software Requirements Document (SRD).
			CO5: Design of a system and be able to critically compare alternative choices
10	**II/II**	**Operating Systems**	**CO1:** Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
			CO2: Introduce the issues to be considered in the design and development of operating system
			CO3: Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix
			CO4: Will be able to control access to a computer and the files that may be shared
			CO5: Demonstrate the knowledge of the components of computer and their respective roles in computing
11	**II/II**	**Database Management Systems**	**CO1:** Gain knowledge of fundamentals of DBMS, database design and normal forms
			CO2: Master the basics of SQL for retrieval and management of data.
			CO3: Be acquainted with the basics of transaction processing and concurrency control.
			CO4: Familiarity with database storage structures and access techniques
			CO5: Design the Entity Relationship.
12	**II/II**	**Software Engineering Lab**	**CO1:** Ability to translate end-user requirements into system and software requirements
			CO2: Ability to generate a high-level design of the system from the software requirements
			CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
			CO4: Ablility to structure the requirements in a Software Requirements Document (SRD).

			CO5: Design of a system and be able to critically compare alternative choices
13	**II/II**	**Object Oriented Programming Using JAVA**	**CO1:** Able to solve real world problems using OOP techniques.
			CO2: Able to understand the use of abstract classes
			CO3: Able to solve problems using java collection framework and I/o classes.
			CO4: Able to develop multithreaded applications with synchronization.
			CO5: Able to develop applets for web applications
14	**II/II**	**DBMS lab**	**CO1:** Gain knowledge of fundamentals of DBMS, database design and normal forms
			CO2: Master the basics of SQL for retrieval and management of data.
			CO3: Be acquainted with the basics of transaction processing and concurrency control.
			CO4: Familiarity with database storage structures and access techniques
			CO5: Design the Entity Relationship.
15	**II/II**	**JAVA lab**	**CO1:**Able to write programs for solving real world problems using java collection frame work
			CO2: Able to write programs concepts s using abstract classes.
			CO3: Able to write multithreaded programs
			CO4: Able to write GUI programs using swing controls in Java.
			CO5: Able to develop applets for web applications
16	**II/II**	**OS LAB**	**CO1:**Simulate and implement operating system
			CO2: Able to implement C programs using Unix system calls
			CO3: Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix
			CO4: Will be able to control access to a computer and the files that may be shared
			CO5: Demonstrate the knowledge of the components of computer and their respective roles in computing

CSD I & II Sem Course Outcomes For The Academic Year 2022-2023			
1	**II/I**	**Discrete Mathematics**	**CO1:** Ability to understand and construct precise mathematical proofs.
			CO2: Ability to use logic and set theory to formulate precise statements
			CO3: Ability to analyze and solve counting problems on finite and discrete structures
			CO4: Ability to describe and manipulate sequences
			CO5: Ability to apply graph theory in solving computing problems
2	**II/I**		**CO1:** Ability to select the data structures that efficiently model the information in a problem.
			CO2: Ability to assess efficiency trade-offs among different data

		Data Structure	structure implementations or combinations.
			CO3: Implement and know the application of algorithms for sorting and pattern matching.
			CO4: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
			CO5: Implement different data structure implementations or combinations.
3	**II/I**	**Mathematical And Statistical Foundations**	**CO1:** Apply the number theory concepts to cryptography domain
			CO2: Apply the concepts of probability and distributions to some case studies
			CO3: Correlate the material of one unit to the material in other units
			CO4: Resolve the potential misconceptions and hazards in each topic of study.
			CO5: Implement probability and distributions.
4	**II/I**	**Computer Oriented Statistical Methods**	**CO1:** Apply the concepts of probability and distributions to case studies
			CO2: Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
			CO3: Apply concept of estimation and testing of hypothesis to case studies
			CO4: Correlate the concepts of one unit to the concepts in other units.
			CO5: Formulate and solve problems involving random variables
5	**II/I**	**Computer Organization And Architecture**	**CO1:** Understand the basics of instructions sets and their impact on processor design.
			CO2: Demonstrate an understanding of the design of the functional units of a digital computer system
			CO3: Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
			CO4: Design a pipeline for consistent execution of instructions with minimum hazards.
			CO5: Recognize and manipulate representations of numbers stored in digital computers
6	**II/I**	**Object Oriented Programming Using JAVA**	**CO1:** Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection
			CO2: Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords
			CO3: Use multithreading concepts to develop inter process communication.
			CO4: Use multithreading concepts to develop inter process communication. Understand the process of graphical user interface design and implementation using AWT or swings.
			CO5: Use multithreading concepts to develop inter process

			communication. Understand the process of graphical user interface design and implementation using AWT or swings.
7	II/I	Object Oriented Programming Using JAVA lab	CO1: Able to write programs for solving real world problems using the java collection framework.
			CO2: Able to write programs using abstract classes.
			CO3: Able to write multithreaded programs
			CO4: Able to write GUI programs using swing controls in Java.
			CO5: Use multithreading concepts to develop inter process communication. Understand the process of graphical user interface design and implementation using AWT or swings.
8	II/I	Data Structure lab	CO1: Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists..
			CO2: Ability to Implement searching and sorting algorithms
			CO3: Implement and know the application of algorithms for sorting and pattern matching.
			CO4: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
			CO5: Implement different data structure implementations or combinations.
9	II/I	Gender Sensitization Lab	CO1: To develop students' sensibility with regard to issues of gender in contemporary India
			CO2: To provide a critical perspective on the socialization of men and women.
			CO3: To introduce students to information about some key biological aspects of genders.
			CO4: To expose the students to debates on the politics and economics of work.
			CO5: To help students reflect critically on gender violence
10	II/I	Skill Development Course (Data Visualization - R Programming/ Power Bi)	CO1: Understand How to import data into Tableau.
			CO2:Understand Tableau concepts of Dimensions and Measures
			CO3:Develop Programs and understand how to map Visual Layouts and Graphical Properties
			CO4: Develop Programs and understand how to map Visual Layouts and Graphical Properties.
			CO5: Create a Dashboard that links multiple visualizations.
11	II/II	Discrete Mathematics	CO1: Understand and construct precise mathematical proofs
			CO2: Apply logic and set theory to formulate precise statements
			CO3: Analyze and solve counting problems on finite and discrete structures.
			CO4: Describe and manipulate sequences
			CO5: Apply graph theory in solving computing problems

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12	II/II	**Business Economics And Financial Analysis**	**CO1:**The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.
			CO2: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
			CO3: The Students can study the firm's financial position by analysing the Financial Statements of a Company.
			CO4: Implement Production, Cost, Market Structure, Pricing aspects are learnt
			CO5: The Students can study the financial position by analysing the Financial Statements of a Company.
13	II/II	**OPERATING SYSTEMS**	**CO1:** Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection).
			CO2: Introduce the issues to be considered in the design and development of operating system
			CO3: Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix
			CO4: Will be able to control access to a computer and the files that may be shared
			CO5: Demonstrate the knowledge of the components of computer and their respective roles in computing
14	II/II	**DBMS LAB**	**CO1:** Gain knowledge of fundamentals of DBMS, database design and normal forms
			CO2: Master the basics of SQL for retrieval and management of data.
			CO3: Be acquainted with the basics of transaction processing and concurrency control.
			CO4: Familiarity with database storage structures and access techniques
			CO5: Design the Entity Relationship.
15	II/II	**CONSTITUTION OF INDIA**	**CO1:**Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
			CO2: Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India..
			CO3: Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
			CO4: Discuss the passage of the Hindu Code Bill of 1956.
			CO5: Under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections
16	II/II	**OS LAB**	**CO1:**Simulate and implement operating system concepts s
			CO2: Able to implement C programs using Unix system calls

			CO3: Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix
			CO4: Will be able to control access to a computer and the files that may be shared
			CO5: Demonstrate the knowledge of the components of computer and their respective roles in computing

MBA Course outcomes for the Academic year 2022-2023

PROGRAMME: MBA	DEGREE: PG	A.Y: 2021-22	SEMESTER: I, II ,III, IV
S.No	**Year/ Sem**	**Course Name**	**Course Outcomes**
1	I-I	Management Organizational Behaviour	**CO1:** To understand the various attitude and personalities and perceptions and leadership and motivation and apply in organizational situations
			CO2: To evaluate the management and contribution of management thinkers
			CO3: To apply the relevance of environmental scanning ,planning and to take decisions
			CO4: To interpret the individual and interpersonal behavior process for team building and group behavior development
			CO5: To analyze the organizing and controlling
2	I-I	Business Economics	**CO1:** To understand and learn the basics of economic principles in business
			CO2: To illustrate determinants of supply and demand and Demand Analysis and Forecasting
			CO3: To develop production and cost estimates
			CO4: To analyze the market structure
			CO5: To develop the pricing strategies
3	I-I	Financial Reporting & Analysis	**CO1:** To understand the basic concepts of financial accounting
			CO2: To summarize preparation of financial statement
			CO3: To develop the inventory valuation
			CO4: To analyze the accounting process
			CO5: To understand the interpretation of accounting concepts

4	I-I	**Research& methodology Statistical Analysis**	**CO1:** To understand and learn basics of Research, Process of Research and elements of research Proposal
			CO2: To apply the various simple and advanced statistical tools
			CO3: To analyze the features and good research design
			CO4: To apply the principals of research methodology for various projects
			CO5: To understand the time series analysis and report writing
5	I-I	**Legal and Business Environment**	**CO1:** To understand all important legal provisions pertaining to Business Laws
			CO2: To Known the business laws related to incorporating a company
			CO3: To understand all important legal regulatory frame work in India
			CO4: To analyze the Law of Contract
			CO5: To develop the negotiable instruments
6	I-I	**Project management**	CO1:Undestands the importance in managing projects with a special focus
			CO2:to understand project planning execution, monitoring and evaluation .
			CO3: students will b able to understand importance of project management
			CO4:Analyse the role of the project planning, execution ,and implementation.
			CO5: Explains the significance of terms in projects

7	I-I	**Business Communication Lab**	**CO1:** To provide an overview of Prerequisites to Business Communication. .
			CO2: To provide an outline to effective Organizational Communication.
			CO3: To impart the correct practices of the strategies of Effective Business writing.
			CO4: TO Discuss the importance of ethical communication Ethics in Business Communication
			CO5: TO Evaluate and practice methods of analysis to assess the quality and reliability of a source
8	I-I	**Statistical Data Analysis Lab**	**CO1:** To understand the importance of project management
			CO2: To apply the project planning and execution and implementation
			CO3: To develop the significance of teams in projects

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			CO4: To analyze the project evaluation techniques
			CO5: To evaluate the organizational behavior in project management
9	I-II	**Human Resource Management**	**CO1:** Explain Nature of HRM, Scope, Functions and Objectives, HRM Policies and practices.
			CO2: Understand SHRM Model
			CO3: Design Human Resource Planning
			CO4: Implement Recruitment & Selection through different sources & tests
			CO5: Make Career Planning
10	I-II	**Marketing Management**	**CO1:** Explain New Product Development & Product Life Cycle
			CO2: Explain Factors influencing pricing decisions
			CO3: Differentiate Product Vs. Brand
			CO4: Illustrate Selecting pricing method, Selecting final price.
			CO5: Explain Wholesaling, Retailing, Franchising, Direct marketing ,Ecommerce Marketing Practices

11	I-II	**Financial Management**	**CO1:** Explain the basic concept of financial management.
			CO2: Apply the tools from financial management this would facilitate the decision making i.e. Capital Budgeting, Ratio Analysis
			CO3: develop analytical skills this would facilitate the decision making in business situations
			CO4: Explain and use of financial analysis techniques i.e. Fund Flow, Cash Flow.
			CO5: Estimate working capital requirement of Business concern
12	I-II	**QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS**	**CO1:** Explain Importance of Decision Sciences & Role of quantitative techniques In decision making
			CO2: Solve numerical on Assignment Models including special cases in Assignment models.
			CO3: Solve numerical on Transportation Models by North West Corner method, Least Cost method, VAM method and Optimal Solution by using MODI Method
			CO4: Solve numerical on Linear Programming problems by graphical method
			CO5: Solve numerical on Markov Chains & Simulation Techniques
13	I-II	**Logistics Supply Chain Management**	**CO1:** Explain the importance, scope and functions of Operations and Supply Chain Management in Present Scenario
			CO2: Explain the term Quality and can related different dimensions of Quality affecting customer satisfaction.
			CO3: Explain different operations processes , and identify different types of process-product matrix

			CO4: Prepare a service blue print for given service providing organization
			CO5: Demonstrate the Production Planning and Control and its functions for effective and efficient operations management
14	**I-II**	**ENTREPRENEURSHIP & design thinking**	**CO1:** understand the nature of entrepreneurship
			CO2:understand the function of the entrepreneur in the successful, commercial application of innovations
			CO3: confirm an entrepreneurial business idea
			CO4: identify personal attributes that enable best use of entrepreneurial opportunities
			CO5: understand the function of the entrepreneur in the successful

15	**I-II**	**Total quality management**	**CO1:** understand the quality concepts to total quality management
			CO2:to facilitate students understand the quality tools and techniques related to total quality management
			CO3: student will be able to understand importance of quality
			CO4: To know about principles and practices of TQM
			CO5: write about the tools and techniques in quality management
16	**II-I**	**Production Operations management**	**CO1:** Gaining knowledge about managing production processes
			CO2: How to run operations effectively.
			CO3: Better understanding of modern production techniques
			CO4: Better understanding of quality management
			CO5: You will learn about practical applications of operations management to plan for the future
17	**II-I**	**Management Information system**	**CO1:** Acquire on job the skills, knowledge, attitudes, and perceptions along with the experience needed to constitute a professional identity.
			CO2: .Get actual supervised professional experiences.
			CO3: Get insight into the working of the real organizations
			CO4: Develop perspective about business organizations in their totality
			CO5: Explore career opportunities in their areas of interest.

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18	II-I	**Business ANALYTICS**	**CO1:** Data will be collected around the business case after careful evaluation of the business case in a particular domain.
			CO2:A Database with the data collected in the above step will be created using SQL.
			CO3: Connect the SQL database with Tableau/ Python/ R and extracting this data into environments
			CO4: Preparation of reports based on the business objective and context
			CO5: Building the dashboard using Tableau/ Power BI
19	II-II	**Risk Management & Financial Derivatives**	**CO1:** Be able to describe standard derivative contracts, their properties and functionality
			CO2: Be able to understand and apply scientific methods for valuation of options and other derivatives, in continuous and discrete time.
			CO3: Be able to interpret and apply risk measures that are commonly used in risk management.
			CO4: Be able to reflect over and critically survey different assumptions and principles behind derivatives pricing and risk management.
			CO5: Demonstrate an understanding of pricing forwards, futures and options contracts
20	II-I	**Security Analysis Portfolio Management**	**CO1:** Explored to different avenues of investment.
			CO2: Equipped with the knowledge of security analysis.
			CO3: apply the concept of portfolio management for the better investment
			CO4: invest in less risk and more return securities
			CO5: Encourage students to apply stock and option valuation models in portfolio management

21	II-I	**Strategic cost &Management Accounting**	**CO1:** Explain how management accounting information is used in strategic decision making.
			CO2: Illustrate the process of strategy formulation, communication, implementation and control within an organization.
			CO3: Explain how to integrate conventional and contemporary management accounting techniques into a strategic management accounting framework
			CO4: Solve practical and applied problems by using research papers and case study analysis
			CO5: Identify and evaluate the business strategies of contemporary organisations, based on an understanding of their internal and external environments;
22	II-I	**TALENT PERFORMANCE**	**CO1:** Setting and defining goals to fulfill company objectives
			CO2: Setting the right expectations for managers and employees
			CO3: Effective communication between individuals and teams

		MANAGEMENT SYSTEMS	**CO4:** Determining individual training and performance plans
			CO5: Determining individual training and performance plans
23	**II-I**	**Learning & Development**	**CO1:** To develop an understanding of the evolution of training & development from a tactical to a strategic function
			CO2: .To provide an insight into what motivates adults to learn and the most appropriate methodologies to impart training
			CO3: To understand the concept of training audit & training evaluation
			CO4: To learn how design a training module and execute it
			CO5: To understand various strategies used by organizations to measure performance & reward for the same

24	**II-I**	**Digital Marketing**	**CO1:**Develop the applications of digital marketing in the globalized market
			CO2: Explain Channels of Digital Marketing
			CO3: Identify the digital marketing plan
			CO4: create Search engine marketing
			CO5: Analyze the Online Advertising
25	**II-I**	**Sales & PRAMOSION Management**	CO1:write about Visualization of Advertising Layout
			CO2:Identify the evaluation of advertising effectiveness
			CO3: Understand the process of sales management
			CO4: describe the sales promotion
			CO5: Evaluate the need for distribution channels and managing them.
26	**II-I**	**Consumer Behaviour**	**CO1**: Demonstrate how knowledge of consumer behaviour can be applied to marketing.
			CO2:Identify and explain factors which influence consumer behavior
			CO3: Relate internal dynamics such as personality, perception, learning motivation and attitude to the choices consumers make.
			CO4: Use appropriate research approaches including sampling, data collection and questionnaire design for specific marketing situations
			CO5: In a team, work effectively to prepare a research report on consumer behaviour issues within a specific context.
27	**II-I**	**EMPLOYEE RELATIONS**	**CO1:** Give overview of Industrial Relations, Legal Framework and Management of Trade Unions in Indian Organizations
			CO2: To elucidate on the processes of Negotiations and Collective Bargaining

			CO3: Elucidate on the aspects of Tripartism and Social Dialogue
			CO4: Explain impart knowledge on Labor Legislation with help of various Acts such as Factories Act, Minimum Wages Act, ESI Act etc
			CO5: Elaborate impart knowledge on Labor Legislation with help of various Acts such as Industrial Disputes Act.
28	**II-I**	**Summer Internship**	**CO1:** Acquire on job the skills, knowledge, attitudes, and perceptions along with the experience needed to constitute a professional identity
			CO2: Get actual supervised professional experiences
			CO3: Get insight into the working of the real organizations
			CO4: Develop perspective about business organizations in their totality
			CO5: Explore career opportunities in their areas of interest
29	**II-II**	**International Marketing**	**CO1**:Explain the Global Marketing Management
			CO2: Undatand the concept ofEnvironment of global markets
			CO3:Analyze Assessing Global Market Opportunities
			CO4:Developing and Implementing Global Marketing Strategies
			CO5: Select the E-Marketing channels organization &controlling of the global marketing programme
30	**II-II**	**Strategic Management**	**CO1:** Explain the importance, scope and concept of Strategy and Strategic Management Process
			CO2: .differentiate between Tactics, Strategies and Planning and importance of each component in Strategic Management
			CO3: Prepare Vision, Mission statements and define goals, objectives for Organization
			CO4: Identify Critical Success Factors. Key Performance Indicators and Key Result Areas for any given service sector
			CO5: Demonstrate the importance of external environmental analysis as well prepare PESTLE Analysis and ETOP model for decision making
31	**II-II**	**HR ANALYTICS**	**CO1:** overview of evolution of HRM and its journey towards Analytics and highlight the need, concepts and scope of HR Analytics linked with business outcomes.
			CO2: Elucidate the methods of capturing, examining & purifying data and to introduce the aspect of HR Metrics in the context of HR Analytics
			CO3:understand knowledge of conduction of HR Analytics for key HR Processes using MS Excel
			CO4: To provide an overview of various tools and software technologies

			used for conduction of Descriptive HR Analytics and Visualization of HR Data.
			CO5: Explain futuristic perspective of Predictive and Prescriptive HR Analytics
32	II-II	FINANCIAL ANALYTICS	**CO1:** To enable understanding of various aspects in Financial Analytics.
			CO2: To help understand time value money, risk and return aspects
			CO3: To impart knowledge of various capital budgeting techniques.
			CO4: To elucidate various aspects of Equity Valuation.
			CO5: To enlighten on the aspects of Bond Valuation.
33	II-II	MARKETING ANALYTICS	**CO1:** To provide an understanding of Fundamentals of Marketing Analytics
			CO2: To elaborate on the scope of MS Excel for conduction of Marketing Analytics,
			CO3: : To highlight the importance of Management of Customer Expectations through Marketing
			CO4: To orient on the usage of Marketing Analytics for Product Pricing and
			CO5:· To impart knowledge on Market Segmentation methods and Advertising using Marketing Analytics
34	II-II	International Human Resource Management	**CO1:** Describe the role of the HR Manager in an International context
			CO2: .Describe Human Resource activities in an International Context
			CO3: List and explain the differences between domestic and international HRM
			CO4: Explain the importance of cultural sensitivity in an international assignment
			CO5: Critically appraise the impact of cultural and contextual factors in shaping human resource practices in MNCs

35	II-II	Leadership and Change Management	**CO1:** Can explain how the particular context of public organizations influences change management and leadership.
			CO2: Is able to apply the key concepts of this course in a systematic analysis of an organizational change process in a public organization
			CO3: Has developed the ability to stay informed about current leadership developments and trends through online resources and networks
			CO4: Can describe the characteristics of central change management approaches and leadership theories
			CO5: Is able to formulate and effectively communicate a change vision in an organizational setting.
36	II-II	Services	CO1: Identify Marketing Management of companies offering Services

		Marketing	CO2:describe the Characteristics of services
			CO3: understand consumer behaviour in services
			CO4: Collect align service design and standards
			CO5: Correlate the delivering service and managing services promises.
37`	**II-II**	**International Financial Management**	**CO1:** Understand international capital and foreign exchange market
			CO2: Identify and appraise investment opportunities in the international environment.
			CO3: Identify risk relating to exchange rate fluctuations and develop strategies to deal with them
			CO4: Develop strategies to deal with other types of country risks associated with foreign operations
			CO5: Express well considered opinion on issues relating to international financial management.
38	**II-II**	**Strategic financial Management**	**CO1:** TO understand and develop the role of financial strategy
			CO2: write resources allocation decision with in a organization
			CO3: students will be able to understand investment decisions in risk and uncertainty
			CO4: Explain strategic investment decisions
			CO5: To understand investment appraisal techniques
39		**Risk management and financial derivatives**	**CO1:** Write the concept of risk management
			CO2: Explain measurements and risk management strategies
			CO3: Explain risk management using forward and features
			CO4: Explain risk management measurement
			CO5: To understand risk management using options and swaps

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ALL DEPARTMENT I&II Sem Course Outcomes for the Academic Year 2021-2022

I-B.Tech Course outcomes for the Academic year 2021- 22			
S.NO.	**YEAR/ SEM**	**COURSE NAME**	**Course Outcomes**
1	I/I	Mathematics-I	**CO 1 :** Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
			CO 2 : Find the Eigen values and Eigen vectors , Reduce the quadratic form to canonical form using orthogonal transformations.
			CO 3 : Analyse the nature of Sequences and Series.
			CO 4 : Solve the applications on the mean value theorems , Evaluate the improper integrals using Beta and Gamma functions
			CO 5 : Find the extreme values of functions of two variables with/without constraints
2	I/I	Applied Physics	**CO : 1** Understand the fundamental concepts of quantum behavior of matter in its micro state
			CO : 2 The knowledge of fundamentals of Semiconductor physics, Optoelectronics enable the students to apply to various systems like communications, solar cell, photo cells and so on.
			CO : 3 The main basics of Lasers and fiber optics relate the basic idea of total internal reflection to the propagation of light and make use of fibre concepts to solve numerical problems and relate to applications in engineering.
			CO : 4 Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
			CO : 5 Analyze the phenomena of electromagnetism and also to have the exposure on magnetic materials and dielectric materials.
3	I/I	AP LAB	**CO : 1** Able to understand the characteristics of Junction diode.
			CO : 2 Students can acquire the knowledge on power and current characteristics of Semiconductor devices.
			CO : 3 Students can identify the type of semiconducting material through Hall Effect.
			CO : 4 Students learn the practical knowledge in quantum concepts by Photo electric effect.
			CO : 5 Students can observe laser characteristics and optical fiber principles
4	I/II	Mathemtics-II	**CO : 1** Identify whether the differential equation of first order is exact or not
			CO 2 : Solve higher differential equations and apply the concept of differential equations to real world problems
			CO 3 : Evaluate the multiple integrals ,finding the areas, volumes for cubes, spheres
			CO 4 : Analysing vector and scalar point functions, scalar potential functions
			CO 5 : Evaluate the line, surface and volume integrals and converting

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			from them one to another
5	I/II	Engineering Chemistry	**CO 1 :** Examine the atomic, molecular and electronic changes and band theory related to conductivity
			CO 2 : Develop suitable treatment schemes to remove the pollutants which are present in water as well as wastewater
			CO 3 : Design appropriate corrosion protection electrochemical techniques in order to control the corrosion of metals
			CO 4 : Design appropriate corrosion protection electrochemical techniques in order to control the corrosion of metals
			CO 5 : Produce the clear concept on basic spectroscopy and formulate medical and other fields.
6	I/II	English	**CO 1 :** Use English language effectively in spoken and written forms
			CO 2 : Comprehend the given texts and respond appropriately
			CO 3 : Communicate confidently in various contexts and different cultures
			CO 4 : Acquire basic proficiency in English including reading and listening ,writing and speaking skills
			CO 5 : Prepare themselves for their careers which may require them to listen to , read , speak and write in English both for their professional and interpersonal communication in the globalised context
7	I/II	EC LAB	**CO 1 :** Determination of parameters liké hardness and chloride content in water .
			CO 2 : Estimation of rate constant of a reaction from concentration.
			CO 3 : Determination of physical properties like adsorption & viscosity
			CO 4 : Determination of concentrations by instrumental method (cond. & potenti.)
			CO 5 : Calculation of RF values of some organic molecules by TLC techniques
8	I/II	ELCS LAB	**CO 1 :** Better understaning of nuances of English language through group activities
			CO 2 : Neutralisation of accent for intelligibility
			CO 3 : Speaking skills with clarity and confidence which inturn enhances their employability skills
			CO 4 : train students to use language appropriately for public speaking and interviews
			CO 5 : focus on production and practice sounds of English language and to help the students with the use of everyday English in formal and informal contexts

Civil Engineering I&II Sem Course Outcomes for the Academic Year 2021-2022			
S.No.	**Year/Sem**	**Course Name**	**Course Outcomes**
1	II/I	**Surveying and Geomatics**	**CO1:**Calculate angles, distances and levels
			CO2: Identify data collection methods and prepare field notes
			CO3: Understand the working principles of survey instruments
			CO4: Estimate measurement errors and apply corrections
			CO5: Interpret survey data and compute areas and volumes
2	II/I	**Engineering geology**	**CO1:**Understand weathering process and mass movement
			CO2: Distinguish geological formations
			CO3: Identify geological structures and process for rock mass quality
			CO4: Identify subsurface information and groundwater potential sites through geophysical investigations
			CO5: Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels
3	II/I	**Strength of Materials-1**	**CO1:**Analyze the statically determinate and inderminate problems.
			CO2: Determine the stresses and strains in the members subjected to axial bending
			CO3: Evaluate the slope and deflection of beams subjected to loads.
			CO4: Determine the principal stresses and strains in structural members
			CO5: Frame an idea to design a system, component or process
4	II/I	**Probability and Statistics**	**CO1:**Understasnd concepts of discrete probability, conditional probability, independence, and be able to apply these concepts to engineering applications
			CO2: Be able to use statistical concepts to analyse and interpret engineering data.
			CO3: Equipping students with essential tools for statistical analyses at the graduate level
			CO4: Providing students with a formal treatement of probability theory
			CO5: Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data
5	II/I	**Fluid Mechanics**	**CO1:**Apply conservation laws to derive governing equations of fluid flows
			CO2: Compute hydrostatic and hydrodynamic forces.
			CO3: Analyze and design simple pipe systems.
			CO4: Apply principles of dimensional analysis to design experiments.
			CO5: Compute drag and lift coefficients.
6	II/I	**Surveying Lab**	**CO1:**Able to perform chain survey and plotting of closed traverse and also obstacles
			CO2: Determines distance between two inaccessible points with compass
			CO3: Perform reduced level and distances using tachometric survey
			CO4: Able to perform trigonometric leveling using theodolite for heights and distances problems.
			CO5: Determines Radiation method, intersection methods by plane table survey

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7	II/I	**Strength of Materials Lab**	**CO1:**Conduct tension test on materials like steel etc.
			CO2: Conduct compression tests on spring, wood and concrete
			CO3: Conduct flexural and torsion test to determine elastic constants
			CO4: Determine hardness of metals
			CO5: Write a technical laboratory report
8	II/I	**Engineering geology Lab**	**CO1:**Undestsnd weathering process and mass movement
			CO2: Distinguish geological formations
			CO3: Identify geological structures and process for rock mass quality
			CO4: Identify subsurface information and groundwater potential sites through geophysical investigations
			CO5: Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels
9	II/I	**Constitution of India**	**CO1:**Understand the emergence and evaluation of Indian constitution
			CO2: Understand the structure and composition of Indian constitution
			CO3: Understand and analyses federalism in the Indian context
			CO4: Analyse panchayath Raj institutions as a medium of decentralization
			CO5: Understand and analyze the three organs of the state in the contemporary scenario
10	II/II	**Basic Electrical and Electronics Engineering**	**CO1:**To analyze and solve electrical circuits using network laws and theorems.
			CO2: To understand and analyze basic electrical and magnetic circuits
			CO3: To study the working principles of electrical machines
			CO4: To introduce components of low voltage electrical installations
			CO5: To identify and characterize diodes and various types of transistors
11	II/II	**Basic Mechanical Engineering for Civil Engineering**	**CO1:**To understand the mechanical equipment for the usage at civil engineering systems.
			CO2: To familiarize with the general principles and requirements for refrigeration, manufacturing
			CO3: To realize the techniques employed to construct civil engineering systems
			CO4: To understand the manufacturing process for the usage at civil engineering constructions
			CO5: Learning the design and working process of machine tools for the usage of construction field
12	II/II	**Building Materials Construction and Planning**	**CO1:**Define the basic terminology that is used in the industry
			CO2: Categorize different building materials, properties and their uses
			CO3: Understand the prevention of damage measures and good workmanship
			CO4: Explain different building services
			CO5: Explain different building plan services
13	II/II	**Strength of Materials-II**	**CO1:**Describe the concepts and principles, understand the theory of elasticity, and perform calculations, relative to the strength of mechanical components in particular to torsion and direct compression;
			CO2: To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading

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			CO3: Analyze strength and stability of structural members subjected To Direct, and Direct and Bending stresses;
			CO4: Understand and evaluate the shear center and unsymmetrical bending.
			CO5: Frame an idea to design a system, component or process
14	II/II	**Hydraulics and Hydraulic Machinery**	**CO1:** Apply their knowledge of fluid mechanics in addressing problems in open channels and hydraulic machinery. .
			CO2: Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions.
			CO3: Apply dimensional analysis and to differentiate the model, prototype and similitude conditions for practical problems.
			CO4: Get the knowledge on different hydraulic machinery devices and its principles that will be utilized in hydropower development and for other practical usages
			CO5: Students able to know the performance of single stage and multistage pumps
15	II/II	**Structural Analysis-I**	**CO1:**An ability to apply knowledge of mathematics, science, and engineering
			CO2: Analyse the statically indeterminate bars and continuous beams
			CO3: Draw strength behavior of members for statis and dynamic loading
			CO4: Calculate the stiffness parameters in beams and pin jointed trusses.
			CO5: Understand the indeterminacy aspects to consider for a total structural system
16	II/II	**Computer aided Civil Engineering Drawing**	**CO1:**Use the Auto cad commands for drawing 2D & 3D building drawings required for different civil engg applications.
			CO2: Plan and draw Civil Engineering Buildings as per aspect and orientation.
			CO3: Presenting drawings as per user requirements and preparation of technical report
17	II/II	**Hydraulics and Hydraulic Machinery Lab**	**CO1:** Describe the basic measurements techniques of fluid mechanics and its appropriate application.
			CO2: Interpret the results obtained in the laboratory for various experiments
			CO3: Discover the practical working of Hydraulic machines different types of Turbines, pumps, and other miscellaneous hydraulic machines
			CO4: Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions.
			CO5: Write a technical laboratory report
18	II/II	**Basic Electrical and Electronics Engineering Lab**	**CO1:** To analyze and solve electrical circuits using network laws and theorems.
			CO2: To understand and analyze basic electrical and magnetic circuits
			CO3: To study the working principles of electrical machines
			CO4: To introduce components of low voltage electrical installations
			CO5: To identify and characterize diodes and various types of transistors

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19	II/II	**Gender Sensitization Lab**	**CO1:** Students will have developed a better understanding of important issues related to gender in contemporary India.
			CO2: Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
			CO3: Students will acquire in slight into the gendered division of labour and its relation to politics and economics.
			CO4: Men and women students and professionals will be better equipped to work and live together as equals.
			CO5: Students will develop a scese of appreciation of women in all walks of life
20	III/I	**Structural Analysis-II**	**CO1:** Analyze the two hinged arches.
			CO2: Solve statically indeterminate beams and portal frames using classical methods
			CO3: Sketch the shear force and bending moment diagrams for indeterminate structures.
			CO4: Formulate the stiffness matrix and analyze the beams by matrix methods
			CO5: Analyze to know the influence lines for indeterminate structures
21	III/I	**Geotechnical Engineering**	**CO1:** Characterize and classify the soils
			CO2: Able to estimate seepage, stresses under various loading conditions amd compaction characteristics
			CO3: Able to analyze the compressibility of the soils
			CO4: Able to understand the strength of soils under various drainage conditions
			CO5: Able to know the failure mechanism and the shear strength of soils
22	III/I	**Structural Engineering-I (RCC)**	**CO1:** Compare and design the singly reinforced, doubly reinforced and flanged sections.
			CO2: Design the axially loaded, uniaxial and biaxial bending columns
			CO3: Classify the footings and design the isolated square, rectangular and circular footings
			CO4: Distinguish and design the one-way and two-way slabs.
			CO5: Students able to know the design of footings for different foundations
23	III/I	**Transportation Engineering**	**CO1:** An ability to apply the knowledge of mathematics, science and engineering in the areas of traffic engineering, highway development and maintenance
			CO2: An ability to design, conduct experiments to assess the suitability of the highway materials like soil, bitumen, aggregates ans a variety of bituminous mixtures. Also the students will develop the ability to interpret the results and assess the suitability of these materials for construction of highways.
			CO3: An ability to design flexible and rigid highway pavements for varying traffic compositions as well as soil subgrade and environmental conditions using standards stipulated by Indian Roads Congress.
			CO4: An ability to evaluate the structural and functional conditions of in-service highway pavements and providesolution in the form of routine maintenance measures or designed overlays using Indian Roads congress.

			guidelines .
			CO5: An ability to assess the issue related to road traffic and provide engineering solutions supported with an understanding of road user psychological and behavioral patterns.
24	**III/I**	**Concrete Technology**	**CO1:** Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting different tests.
			CO2: Recognize the effects of rheology and early age properties of concrete on its long term behavior.
			CO3: Apply the use of various chemical admixtures and mineral additives to design cement-based materials with tailor-made properties
			CO4: Use advanced laboratory techniques to characterize cement-based materials.
			CO5: Perform mix design and engineering properties of special concretes such as high-performance concrete, self-compacting concrete, and fiber reinforced concrete.
25	**III/I**	**Engineering Economics and Accountancy**	**CO1:** To perform and evaluate present and future worth of the alternate projects and to appraise projects by using traditional and DCF methods.
			CO2: To carry out cost benefit analysis of projects and to calculate BEP of different alternative projects.
26	**III/I**	**Highway Engineering and Concrete Technology Lab**	**CO1:**Categorize the test on materials used Civil Engineering Buildings & Pavement constructions
			CO2: To perform the tests on concrete for it characterization
			CO3: To design concrete mix proportioning by using Indian standard method
			CO4: Examine the tests performed for bitumen mixes
			CO5: To prepare a laboratory report
27	**III/I**	**Geotechnical Engineering Lab**	**CO1:**At the end of the course, the students will be able to classify and evaluate the behavior of the soils subjected to various loads.
28	**III/I**	**Advanced Communication Skills Lab**	**CO1:**The students will able to use English language both written and spoken
			CO2: The students will able to enrich their comprehension ability and fluency
			CO3: To understand the concept and will gain confidence level in the appearing in the jam, debate role-play
			CO4: The students will able to develop the study skills and communication skills in formal and informal situations
			CO5: The students will able to improve the language proficiency in English with writing skills also
29	**III/I**	**Intellectual Property Rights**	**CO1:** Intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.
			CO2: Purpose and function of trademarks, acquisition of trade mark rights
			CO3: Foundation of patent law, patent searching process, ownership rights and transfer
			CO4: New development of intellectual property: new developments in trade mark law; copy right law,patent law, intellectual property audits
30	**III/II**	**Hydrology and**	**CO1:**Understand the different concepts and terms used in engineering

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		Water Resource Engineering	hydrology
			CO2: To identify and explain various formulae used in estimation of surface and ground water hydrology components .
			CO3: Demonstrate their knowledge to connect hydrology to the field requirement
			CO4: The students will able to know the to increase the ground water table depends upon clainmatic factors
			CO5: To understand and the importance of canal regulation system in irrigation
31	**III/II**	**Environmental Engineering**	**CO1:**Asess characteristics of water and wasterwater and their impacts
			CO2: Estimate quantities of water and wasterwater and plan conveyance components
			CO3: Design components of water and waste water treatment plants
			CO4: Be conversant with issues of air pollution and control
			CO5: To understand the concept of various unit operations and design of water treatment systems
32	**III/II**	**Foundation Engineering**	**CO1:**Understands the principles and methods of Geotechnical Exploration
			CO2: Decide the suitability of soils and check the stability of slopes
			CO3: Calculate lateral earth pressures and check the stability of retaining walls
			CO4: Analyse and design the shallow and deep foundations
			CO5: Student will able to analyse and design of well foundations
33	**III/II**	**Structural Engineering-II (Steel)**	**CO1:** Analyze the tension members, compression members.
			CO2: Design the tension members, compression members and column bases and joints and connections
			CO3: Analyze and design the beams including built-up sections and beam and connections.
			CO4: Identify and Design the various components of welded plate girder including stiffeners
			CO5: Analyze and design of roof trusses
34	**III/II**	**Prestressed Concrete**	**CO1:**Acquire the knowledge of evolution of process of pre stressing
			CO2: Acquire the knowledge of various pre stressing techniques
			CO3: Develop skills in analysis design of pre stressed structural elements as per the IS codai provisions
			CO4: To develop transformation of stresses in pretensioned members
			CO5: Students will able to know the composite beams and deflections
35	**III/II**	**Environmental Engineering Lab**	**CO1:** Understand about the equipment used to conduct the test procedures
			CO2: Perform the experiments in the Iab
			CO3 :Examine and Estimate water waste water,air and soil Quality
			CO4: Compare the water, air quality standards with prescribed standards set by the local governments
			CO5: Develop a report on the quality aspect of the environment
36	**III/II**	**Computer Aided Design Lab**	**CO1:** Model the geometry of real-world structure represent the physical model of structural element /structure
			CO2: Perform analysis

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			CO3: Design the structural elements and a system as per IS Codes
			CO4: Interpret from the post processing results
37	III/II	**Environmental Science**	**CO1:** Get the knowledge about the different types of resources like land, water, mineral and energy and also about the effects of environments by the usage of these resources
			CO2: Get the information about ecosystem and also about its functions like food chain Ecological pyramids etc
			CO3: Gain the knowledge about the ecosystem diversity its values and also about the importance of the endemic species and differtent techniques involved in its conservation
			CO4: Gain the knowledge about the different types of pollutions and their control technologies, Waste water treatment , Bio medical waste management etc
			CO5: Get the complete information about EIA-Environmental Impact Assessment ,Sustainable developmental activities , environmental policies and regulations awareness among people
38	III/II	**Advanced Structural Analysis**	**CO1:**Analyze the multistory building frames by various approximate methods
			CO2: Solve the continuous beams portal frames by matrix methods of analysis
			CO3: Analyze and design of large frames with or without shear walls
			CO4: Analyze and design plane truss continuous beams
			CO5: students will able to know the structural behaviors of large frames
39	IV/I	**Transportation Engineering-II**	**CO1:** Understand Plan highway networks
			CO2: Design highway geometrics
			CO3: Design Intersections and prepare traffic management plans.
			CO4: Design flexible and rigid pavements
			CO5: An ability to assess the issue related to road traffic and provide engineering solutions supported with an understanding of road user psychological and behavioral patterns.
40	IV/I	**Estimation Quantity Surveying and Valuation**	**CO1:**Understand the technical specifications for various works to be performed for a project
			CO2: Quantify the worth of a structure by evaluating the quantities of constituencies , derive their cost rates
			CO3: Understand how competitive bidding works and how to submit a bidding proposal
			CO4: An idea of how to optimize construction projects based on costs
			CO5: An ability to put forward ideas and understandings to others with effective communication processes
41	IV/I	**Ground Improvement Techniques**	**CO1:** Identify the purpose of ground improvement techniques to obtain the suitable construction site for long-lasting structures.
			CO2: List the problematic soils and its characteristics to select the suitable method for ground improvement.
			CO3: Illustrate the various methods of ground improvement techniques to increase load bearing capacity of beneath and surface soils

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			CO4: Apply the methods of physical, chemical, mechanical and hydraulic for obtaining void less soils
			CO5: Explain the various grouting techniques and its applications for improving loadbearing of beneath soils
42	IV/I	**Traffic Engineering**	**CO1:**Understand basics principal of Traffic Engineering
			CO2: Analyze parking data and model accidents
			CO3: Determine capacity and LOS.
			CO4: To provide engineering techniques to achieve safe and efficient movement of people and goods on roadways
			CO5: Students will able to know deal with traffic issues including safety planning design operation and control
43	IV/I	**Utilization of Electrical Energy**	**CO1:**Able to maintain electric drives used in an industries
			CO2: Able to identify a heating/ welding scheme for a given application
			CO3: Able to maintain/ Trouble shoot various lamps and fittings in use
			CO4: Able to figure-out the different schemes of traction schemes and its main components
			CO5: Able to design a suitable scheme of speed control for the tractiuon systems
44	IV/I	**Airports, Railways and Waterways**	**CO1:**At the end of this course, the students will develop:
			CO2: An ability to design of runways and taxiways.
			CO3: An ability to design the infrastructure for large and small airports
			CO4: An ability to design various crossings and signals in Railway Projects.
			CO5: An ability plan the harbors and ports projects including the infrastructure required for new ports and harbors.
45	IV/I	**Non-Conventional Energy Sources**	**CO1:**Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells.
			CO2: Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation.
			CO3: Explore the concepts involved in wind energy conversion system by studying its components, types and performance
			CO4: Illustrate ocean energy and explain the operational methods of their utilization
			CO5: Acquire the knowledge on Geothermal energy.
46	IV/I	**Ground Water Hydrology**	**CO1:** Various components of hydrologic cycle that affect the movement of water in the earth
			CO2: Various Stream flow measurements technique
			CO3: the concepts of movement of ground water beneath the earth
			CO4: the basic requirements of irrigation and various irrigation techniques, requirements of the crops
			CO5: Distribution systems for canal irrigation and the basics of design of unlined and lined irrigation canals design CO- 6 Basic components of river Training works.
47	IV/I	**Transportation Engineering Lab**	**CO1:**At the end of the course, the students will be able to Asses for Highway construction properties of highway materials

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48	IV/I	**Environmental Engineering Lab**	**CO1:**The students will develop the knowledge in mathematics science and engineering
			CO2: The students will be able to design and conduct experiments interpret and analyze data and report results
			CO3: The students will demonstrate the ability to design of civil Engineering systems or a process that meets desired specifications and requirements related to all fields of civil Engineering
			CO4: The students will demonstrate the ability to function on engineering and science laboratory teams, asa well as on multidisciplinary design teams
			CO5: The students will demonstrate the ability to identify, formulate and solve Civil engineering problems
49	IV/I	**Industry Oriented Mini Project**	**CO1:**Formulate a real world problem and develop its requirements
			CO2: Ability to plan and execute well defined objective
			CO3: Ability to work in team at component level
			CO4: Ability to solve problems on analysis & design
			CO5: Self learn new software's and /or techniques that contribute to the software solution of the project
50	IV/I	**Seminar**	**CO1:**The students will be able to recall existing technologies in the area of Designing
			CO2: The students will be to able describe compare and evaluate different technologies
			CO3: The students will be to able decide the area of interest
			CO4: The students will demonstrate the ability to identify, formulate and solve Civil engineering problems
			CO5: The students will be to able to write technical reports
51	IV/II	**Solid Waste Management**	**CO1:**Identify the physical and chemical composition of wastes
			CO2: Analyze the functional elements for soild waste management
			CO3: Analyze the functional elements for liquid waste management
			CO4: To understand the effluent treatment Plants and its disposal
			CO5: Plan measures for reclamation of saline soils
52	IV/II	**Industrial Waste Water Treatment**	**CO1:**Identify the characteristics of industrial wastewaters
			CO2: Describe pollution effects of disposal of industrial effluents
			CO3: Identify and design treatment options for industrial wastewater
			CO4: Formulate environmental management plan
			CO5: Suggestion methods for safe disposal of hazardous wasters
53	IV/II	**Pavement Design**	**CO1:**Characterize the response characteristics of soil, aggregate, asphalt mixes
			CO2: Analyze flexible pavements
			CO3: Analyze rigid pavements
			CO4: Design a flexible pavement using IRC, Asphalt Institute and AASHTO methods
			CO5: Design a rigid pavement using IRC, and AASHTO methods
54	IV/II	**Major Project**	**CO1:**Student will able to work in a group as a part of multidisciplinary team with professional responsibility

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			CO2: Student will able to Analyse and design of structure to meet desired needs with in realistic constraints
			CO3: Student is capable of doing Review litereture and finalizes problem statement
			CO4: Student can plan activity schedule and implementation in agiven time span
			CO5: Student will be able to prepare and present technical report

Electrical & Electronics Engineering I & II Sem Course outcomes for the Academic year 2021- 2022

S.No.	Year/Sem	Course Name	Course Outcomes
1	II/I	Engineering Mechanics	**CO1:** Determine resultant of forces acting on a body and analyse equilibrium of a body subjectedto a system of forces.
			CO2: Solve problem of bodies subjected to friction.
			CO3: Find the location of centroid and calculate moment of inertia of a given section.
			CO4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatorymotion and rigid body motion.
			CO5: Solve problems using work energy equations for translation, fixed axis rotation and planemotion and solve problems of vibration.
2	II/I	Electrical Circuit Analysis	**CO1:** Apply network theorems for the analysis of electrical circuits.
			CO2: Obtain the transient and steady-state response of electrical circuits.
			CO3: Analyze circuits in the sinusoidal steady-state (single-phase and three-phase).
			CO4: Analyze electrical circuit analysis using Laplace transforms.
			CO5: Analyze two port circuit behaviors.
3	II/I	Analog Electronics	**CO1:** Know the characteristics, utilization of various components.
			CO2: Understand the biasing techniques
			CO3: Design and analyze various rectifiers, small signal amplifier circuits.
			CO4: Design sinusoidal and non-sinusoidal oscillators.
			CO5: A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linearintegrated circuits
4	II/I	Electrical Machines - I	**CO1**: Identify different parts of a DC machine & understand its operation
			CO2: Carry out different testing methods to predetermine the efficiency of DC machines
			CO3:. Understand different excitation and starting methods of DC machines
			CO4: Control the voltage and speed of a DC machines
			CO5 Analyze single phase and three phase transformers circuits.
			CO1: To understand the basic laws of electromagnetism.
			CO2: To obtain the electric and magnetic fields for simple configurations under

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5	II/I	Electromagnetic Fields	static conditions.
			CO3: To analyze time varying electric and magnetic fields.
			CO4: To understand Maxwell's equation in different forms and different media.
			CO5: To understand the propagation of EM waves.
6	II/I	Electrical Machines Lab –I	**CO1:** Start and control the Different DC Machines
			CO2: Assess the performance of different machines using different testing methods
			CO3: Identify different conditions required to be satisfied for self - excitation of DC Generators.
			CO4: Separate iron losses of DC machines into different components
			CO5: To understand characteristics of d.c generator and motor.
7	II/I	Analog Electronics Lab	**CO1:** Know the characteristics, utilization of various components.
			CO2: Understand the biasing techniques
			CO3: Design and analyze various rectifiers, small signal amplifier circuits
			CO4: Design sinusoidal and non-sinusoidal oscillators.
			CO5: A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linear integrated circuits.
8	II/I	Electrical Circuits Lab	**CO1:**Analyze complex DC linear circuits
			CO2: Analyze complex AC linear circuits
			CO3: Apply concepts of electrical circuits across engineering
			CO4: Evaluate response in a given network by using theorems
			CO5: Evaluate response in two port network
9	II/II	Laplace Transforms, Numerical Methods And Complex Variables	**CO1:** Use the Laplace transforms techniques for solving ODE's
			CO2: Find the root of a given equation.
			CO3: Estimate the value for the given data using interpolation
			CO4: Find the numerical solutions for a given ODE's
			CO5: Analyze the complex function with reference to their analyticity, integration using Cauchy'sintegral and residue theorems
			CO6: Taylor's and Laurent's series expansions of complex function
10	II/II	Electrical Machines – II	**CO1:** Understand the concepts of rotating magnetic fields.
			CO2: Understand the operation of ac machines
			CO3: Analyze performance characteristics of ac machines.
			CO4: Understand the parallel operation of synchronous machines
			CO5: Analyze the Single Phase & Special Machines
11	II/II	Digital Electronics	**CO1:** Understand working of logic families and logic gates.
			CO2: Design and implement Combinational and Sequential logic circuits.
			CO3: Understand the process of Analog to Digital conversion and Digital to Analog conversion
			CO4: Be able to use PLDs to implement the given logical problem.
			CO1: Understand the modeling of linear-time-invariant systems using transfer

12	II/II	Control Systems	function and state-space representations
			CO2: Understand the concept of stability and its assessment for linear-time invariant systems
			CO3: Understand the frequency response analysis
			CO4: Design simple feedback controllers.
			CO5: Analyze State Variable Analysis and Concepts of State Variables.
13	II/II	Power System-I	**CO1:** Understand the concepts of power systems
			CO2: Understand the operation of conventional generating stations and renewable sources ofelectrical power.
			CO3: Evaluate the power tariff methods
			CO4: Determine the electrical circuit parameters of transmission lines
			CO5: Understand the layout of substation and underground cables and corona.
14	II/II	Digital Electronics Lab	**CO1:** Understand working of logic families and logic gates.
			CO2: Design and implement Combinational and Sequential logic circuits.
			CO3: Understand the process of Analog to Digital conversion and Digital to Analog conversion.
			CO4: Be able to use PLDs to implement the given logical problem.
15	II/II	Electrical Machines Lab –II	**CO1:** Assess the performance of different machines using different testing methods
			CO2: To convert the Phase from three phase to two phase and vice
			CO3: Compensate the changes in terminal voltages of synchronous generator after estimating the change by different methods
			CO4: Control the active and reactive power flows in synchronous machines
			CO5: Start different machines and control the speed and power factor
16	II/II	Control Systems Lab	**CO1:** How to improve the system performance by selecting a suitable controller and/or a compensator for a specific application
			CO2: Apply various time domain and frequency domain techniques to assess the system performance
			CO3: Apply various control strategies to different applications
			CO4: Test system controllability and observability using state space
			CO5: Analyze the transfer function of machines
17	III/I	Power Electronics	**CO1:** Understand the differences between signal level and power level devices.
			CO2: Analyze controlled rectifier circuits.
			CO3: Analyze the operation of DC-DC choppers.
			CO4: Analyze the operation of voltage source inverters.
			CO5: Analyze ac-to ac converters.
18	III/I	Power System –II	**CO1:** Analyze transmission line performance.
			CO2: Apply load compensation techniques to control reactive power

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			CO3: Understand the application of per unit quantities
			CO4: Design over voltage protection and insulation coordination
			CO5: Determine the fault currents for symmetrical and unbalanced fault
19	**III/I**	**Measurements And Instrumentation**	**CO1:** Understand different types of measuring instruments, their construction, operation andcharacteristics
			CO2: Identify the instruments suitable for typical measurements
			CO3: Apply the knowledge about transducers and instrument transformers to use them effectively.
			CO4: Apply the knowledge of smart and digital metering for industrial applications
			CO5: Understand Transducers
20	**III/I**	**High Voltage Engineering**	**CO1:** Understand the basic physics related to various breakdown processes in solid, liquid andgaseous insulating materials
			CO2: Knowledge of generation and measurement of D.C voltages.
			CO3: Knowledge of generation and measurement of A.C voltages.
			CO4: Knowledge of how over-voltages arise in a power system, and protection against these over-voltages.
			CO5: Knowledge of tests on H. V. equipment and on insulating materials, as per the standards.
21	**III/I**	**Business Economics And Financial Analysis**	**CO1:**The students will understand the various Forms of Business and the impact of economic variables on the Business
			CO2: The Demand, Supply, Production, Cost, Market Structure, Pricingaspects are learnt.
			CO3: Students can study the firm's financial position
			CO4: by analyzing the Financial Statements of a Company.
22	**III/I**	**Power System Simulation Lab**	**CO1:** Perform various transmission line calculations
			CO2: Understand Different circuits time constants
			CO3: Analyze the experimental data and draw the conclusions.
			CO4: Analyze the resonance circuits
23	**III/I**	**Power Electronics Lab**	**CO1:** Understand the operating principles of various power electronic converters.
			CO2: Use power electronic simulation packages& hardware to develop the power converters.
			CO3: Analyze and choose the appropriate converters for various applications
			CO4: Analyze the inverters
24	**III/I**	**Measurement and Instrumentation lab**	**CO1:** to choose instruments
			CO2: test any instrument
			CO3: find the accuracy of any instrument by performing experiment

			CO4: calibrate PMMC instrument using D.C potentiometer
25	**III/I**	**Disaster Preparedness & Planning Management**	**CO1:** the application of Disaster Concepts to Management
			CO2: Analyzing Relationship between Development and Disasters
			CO3: Ability to understand Categories of Disasters
			CO4: Realization of the responsibilities to society.
26	**III/II**	**Power Semiconductor Drives**	**CO1:** Identify the drawbacks of speed control of motor by conventional methods.
			CO2: Differentiate Phase controlled and chopper-controlled DC drives speed-torque characteristicsmerits and demerits
			CO3: Understand Ac motor drive speed–torque characteristics using different control strategies itsmerits and demerits
			CO4: Describe Slip power recovery schemes
			CO5: Understand Control of Synchronous Motors
27	**III/II**	**Signals and Systems**	**CO1:** Differentiate various singal functions
			CO2: Represent any arbitrary signal in time and frequency domain
			CO3: Understand the characteristics of linear time invariant systems
			CO4: Analyze the signals with different transform technique
28	**III/II**	**Microprocessors & Microcontrollers**	**CO1:** Understands the internal architecture, organization and assembly language programming of8086 processors.
			CO2: Understands the internal architecture, organization and assembly language programming of8051/controllers
			CO3: Understands the interfacing techniques to 8086 and 8051 based systems.
			CO4: Understands the internal architecture of ARM processors and basic concepts of advanced ARMprocessors.
29	**III/II**	**Power System Protection**	**CO1:** Compare and contrast electromagnetic, static and microprocessor-based relays
			CO2: Apply technology to protect power system components
			CO3: Select relay settings of over current and distance relays.
			CO4: Analyze static relays
			CO5: Analyze quenching mechanisms used in air, oil and vacuum circuit breakers
30	**III/II**	**Power System Operation And Control**	**CO1:** Understand power flow studies
			CO2: Understand operation and control of power systems
			CO3: Analyze load frequency control
			CO4 :Analyze whether the machine is in stable or unstable position
			CO5: Analyze various functions of Energy Management System (EMS)

			functions.
31	III/II	Power System Lab	**CO1:** Perform various load flow techniques
			CO2: Understand Different protection methods
			CO3: Analyze the experimental data and draw the conclusions.
32	III/II	Microprocessors & Microcontrollers Lab	**CO1:** Understand the Assembly Language Programs to 8086
			CO2: Understand the Bit level Logical Operations
			CO3: Understand the Assembly Language Programs Arithmetic 16 Bit
			CO4: Understand the Time delay Generation Using Timers of 8051
			CO5: Understand the Serial Communication from / to 8051 to / from I/O devices
33	III/II	Signals and Systems lab	**CO1:** Understand the concepts of continuous time and discrete time systems.
			CO2: Analyse systems in comlex frequency domain
			CO3: Understand sampling theorem and its implications.
34	IV/I	Principle of entrepreneurship	**CO1:**understand entrepreneurship
			CO2: Analyze financing and managing
			CO3: Understand production and management
			CO4:understand labour legislation
35	IV/I	electrical and hybrid vehicles	**CO1:** understand the models to describes vehicles
			CO2: understand the models to describes hybrid vehicles
			CO3:understand the different possible ways of energy storage
			CO4: understand the different strategies related to energy storage systems.
36	IV/I	Hvdc Transmission	**CO1:** Compare EHV AC and HVDC system and to describe various types of DC links
			CO2: Analyze Graetz circuit for rectifier and inverter mode of operation
			CO3: Describe various methods for the control of HVDC systems and to perform power flow analysisin AC/DC systems
			CO4: Describe various protection methods for HVDC systems and classify Harmonics and designdifferent types of filters
37	IV/I	Fundamentals Of Management For Engineers	**CO1:** The students understand the significance of Management in their Profession
			CO2: various Management Functions like Planning, Organizing, Staffing, Leading, Motivation
			CO3: Control aspects are learnt in this course.
			CO4: The students can explore the Management Practices in their domain area.
38	IV/I	Electrical & Electronics Design Lab	**CO1:** Get practical knowledge related to electrical
			CO2: Fabricate basic electrical circuit elements/networks
			CO3: Trouble shoot the electrical circuits

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			CO4: Get hardware skills such as soldering, winding etc.
39	IV/II	ENVIRONMENT IMPACT ASSESSMENT	**CO1:**Identify the environment attribute to be considered for EIA
			CO2: Formulate objectives of the EIA
			CO3: Identify the methodology to prepare rapid EIA
			CO4: Prepare EIA reports and environment management plans
40	IV/II	**Power Quality & Facts**	**CO1:** Know the severity of power quality problems in distribution system
			CO2: Understand the concept of voltage sag transformation from up-stream (higher voltages) todown-stream (lower voltage)
			CO3: Concept of improving the power quality to sensitive load by various mitigating custom powerdevices
			CO4: Choose proper controller for the specific application based on system requirements
			CO5: Understand various systems thoroughly and their requirements
			CO6: Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz.Transient stability Enhancement, voltage instability prevention and power oscillation damping
			CO7: Understand the Power and control circuits of Series Controllers GCSC, TSSC and TCSC
41	IV/II	**Electrical Distribution Systems**	**CO1:** distinguish between transmission, and distribution line and design the feeders
			CO2: compute power loss and voltage drop of the feeders
			CO3: design protection of distribution systems
			CO4: understand the importance of voltage control and power factor improvement

Mechanical Engineering I and II Course Outcomes for the Academic Year 2021-2022

S.No	Year/Sem	Course Name	Course Outcomes
1	II/I	**Metallurgy and Material science**	**CO1:** Identify the properties of metals with respect to crystal structure and grain size
			CO2: Interpret the phase diagrams of materials
			CO3: Classify and Distinguish different types of cast irons, steels and non ferrous alloys
			CO4: Describe the concept of heat treatment of steels & strengthening mechanisms
			CO5: Explain the powder metallurgy process, types and manufacturing of composite materials
2	II/I	**Mechanics Of Solids**	**CO1:**Understand the concepts of stress and strain and evaluate
			CO2: Apply the concept of shear force and bending moment for simple structural problems
			CO3: Apply the concepts of principal stresses and strains , body subjected to direct stresses accompanied by shear stresses
			CO4: Evaluate bending stresses and shear stresses for simple structures
			CO5: Analyze thin cylinders subjected to various stresses
			CO6: Evaluate stresses in shafts.

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3	II/I	Thermo-Dynamics	**CO1:** Understand and differentiate between different thermodynamic system and process
			CO2: Understand and apply the laws of thermodynamics to different types of systems.
			CO3: Undergoing various processes and to perform thermodynamic analysis.
			CO4: Understand and analyze the thermodynamic cycle.
			CO5: Understand and evaluate performance parameters.
			CO6: Develop the concept of power cycle with description and representation on p-v and T-S diagram
4	II/I	Production Technology	**CO1:** Elaborate the fundamentals of various moulding casting techniques and furnaces.
			CO2: Identify the importance of permanent joining and principle behind different welding processes
			CO3: Explain the concepts of solid-state welding processes
			CO4: Understand the concepts of rolling and sheet metal operations in metal working.
			CO5: Elaborates the uniqueness of extrusion, forging and high energy rate forming processes in metal working.
			CO6: Develop process-maps for metal forming process using plasticity principles and identify the effect of process variable to manufacturing defect free products.
5	II/I	Machine Drawing Practice	**CO1:** Preparation of engineering and working drawings with dimensions and bill of material during design and development. Developing assembly drawings using part drawings of machine components
			CO2: Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.
			CO3: Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.
			CO4: Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.
			CO5: Title boxes, their size, location and details - common abbreviations and their liberal usage.
			CO6: Types of Drawings – working drawings for machine parts.
6	II/I	Probability And Statistics& Complex Variable	**CO1:** Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
			CO2: analyze the complex function with reference to their analyticity ,integration using cauchy's integral and residue theorems

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			CO3:taylor's and Laurent'series expansions of complex function
			CO4: Evaluate the integrals using Cauchy's integral formula and residue theorems.
			CO5: Solve the problems involving random variables.
7	**III/I**	**Dynamics Of Machinery**	**CO1:** Apply the knowledge of the gyroscopic effect and evaluate the stability of Ship, Aero plane, Two wheeler and Four wheeler.
			CO2: Understand the concept of Equilibrium of a body subjected to static and dynamic forces
			CO3: Analyze the concept of fluctuation energy, inertia of connecting rod- inertia force in reciprocating engines
			CO4: Develop the ability to identify a problem and apply the fundamental concepts of transmission and concepts of friction
			CO5: Understand the significance of governors and balancing of masses in various machines where ever applicable
			CO6: Develop the ability to function on multi-disciplinary teams by having knowledge of vibrations
8	**III/I**	**Thermal Engineering - II**	**CO1:**Develop state – space diagrams based on the schematic diagrams of process flow of steam and gas turbine plants
			CO2: Apply the laws of Thermodynamics to analyze thermodynamic cycles
			CO3: Differentiate between vapour power cycles and gas power cycles
			CO4: Infer from property charts and tables and to apply the data for the evaluation of performance parameters of the steam and gas turbine plants
			CO5: Understand the functionality of major components of steam and gas turbine plants and to do the analysis of these components
9	**III/I**	**Design Of Machine Members-I**	**CO1:** The student acquires the knowledge about the principles of design, material selection, component behavior subjected to loads, design on the basis of strength & rigidity, and analyze the stresses & strains induced in a machine element
			CO2: Understands the concepts of principal stresses, Failure theories and design of components subjected to various static loads
			CO3: Student can able to design the machine components subjected to various varying & reversal loadings considering stress concentration in machine members
			CO4: Students will able to design the joints such as Bolted, Welded and Riveted Joints used in industrial Applications
			CO5: Students can design various keys used in Power Transmission Applications and also they can able to design various Cotter and Knuckle Joints
			CO6: Students can able to design the shafts and their couplings used in Industrial Power Transmission Applications
10	**III/I**	Metrology And	**CO1:** Identify techniques to minimize the errors in measurement.

		Machine Tools	**CO2:** Identify methods and devices for measurement of length, angle, gear & thread parameters, surface roughness and geometric features of parts.
			CO3: Understand working of lathe, shaper, planar, drilling, milling and grinding machines.
			CO4: Comprehend speed and feed mechanisms of machine tools
			CO5: Estimate machining times for machining operations on machine tools

Electronics and communication Engineering I & II Sem Course Outcomes For The A.Y. 2021-2022			
S.NO.	**YEAR /SEM**	**COURSE NAME**	**Course Outcomes**
1	**II/I**	**Electronics Devices &Circuits**	**CO1:** Analyze the applications of the p-n diode as rectifier and Zener diode as voltage regulator
			CO2: Analyze the characteristics of BJT in CB, CE and CC configurations
			CO3: Design and analyze the transistor biasing circuits for a given operating point
			CO4: Design and analyze amplifiers at low frequencies using h parameter model
			CO5: Analyze FET and MOSFET amplifiers at low frequencies
2	**II/I**	**Network Analysis & Transmissio n Theory**	**CO1:** Gain the knowledge on basic RLC circuits behavior
			CO2: Analyze the Steady state and transient analysis of RLC Circuits.
			CO3: Know the characteristics of two port network parameters
			CO4: Analyze the transmission line parameters and configurations
			CO5: Integrate the wave propagation through transmission lines and compute the smith chart and impedance matching the device
3	**II/I**	**Digital System Design.**	**CO1:** Understand the numerical information in different forms and Boolean Algebra theorems.
			CO2: Understand Postulates of Boolean algebra and to minimize combinational functions.
			CO3: Design and Analyze combinational and sequential circuits.
			CO4: Analyse and solve varies engineering problems with FSM
			CO5: Know about the logic families and realization of logic gates.
4	**II/I**	**Signals and Systems**	**CO1:** Defining the various signals and identifying the signal functions& relations
			CO2: Represent any arbitrary signal in time and frequency domain.
			CO3: Understand the characteristics of linear time invariant systems.
			CO4: Analyze the signals with different transform technique
			CO5: Use sampling theorem for base band and band pass signals for various type of sampling and correlation
5	**II/I**	**Probability Theory and**	**CO1:** Understand probabilities and able to solve using an appropriate sample space

		Stochastic Process	**CO2:** Compute various operations like expectations from probability density functions (pdfs) and probability distribution functions
			CO3: Understand the concept of random process, differentiate between stochastic and ergodic processes
			CO4: Understand Auto-correlation and cross correlation properties between two random variables
			CO5: To apply the concepts of noise and information theory in communication systems
6	**II/I**	**Electronics Devices &Circuits Lab**	**CO1:** Analyze the characteristics of p-n junction diode and Zener diode and calculate the dynamic and static resistance in forward bias and reverse bias respectively
			CO2: Calculate the ripple factor and efficiency of Half Wave and Full wave rectifiers with and without filters.
			CO3: Analyze the characteristics of BJT in Common Emitter and Common Base configurations and calculate the corresponding h-parameters
			CO4: Analyze the characteristics of FET in Common Source configuration and calculate the gm and rd. CO 5 Calculate Bandwidth of BJT/FET amplifier from its frequency response.
			CO5: Obtain the characteristics of UJT and SC
7	**II/I**	**Digital System Design Lab**	**CO1:** Implement Boolean Expressions using universal logic gates .
			CO2: Design and verify Combinational logic circuits using IC's .
			CO3: Design and verify Sequential logic circuits using IC's
			CO4: Implement Counters & Shift registers using FF's
			CO5: Design and realization of sequence detector using FSM
8	**II/I**	**Basic Simulation Lab**	**CO1:** Synthesize a given waveform using standard test signals and sequences.
			CO2: Analyze the effect of various transformations applied on independent and dependent variables of a signal.
			CO3: Determine the symmetry (even/odd) of signals /sequences.
			CO4: Classify a system based on its characteristics and find its response for various excitations.
			CO5: Convert time domain signal into frequency domain using Fourier transform and plot its magnitude and phase spectrum.

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9	II/I	**Constitution of India**	**CO1:** Historical perspective of the Constitution of India
			CO2: Fundamental Duties and its legal status .
			CO3: Federal structure and distribution of legislative and financial powers between the Union and the States
			CO4: The historical perspectives of the constitutional amendments in India
			CO5: Scope of the Right to Life and Personal Liberty
10	II/II	**Laplace Transforms; Numerical Methods & Complex Variables**	**CO1:** understand the Laplace transforms techniques for solving ode's
			CO2: find the root of a given equation.
			CO3: calculate the value for the given data using interpolation
			CO4: analyze the numerical solutions for a given ode's
			CO5: analyze the complex function with reference to their analyticity, integration using cauchy'sintegral, residue theorems and understand taylor's and laurent's series
11	II/II	**Electromagnetic Fields and Waves**	**CO1:** Get the knowledge of Basic Laws, Concepts and proofs related to Electrostatic Fields
			CO2: Acquire the knowledge of basic law's concepts andproofs related to Magnetostatic Fields
			CO3: Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions.
			CO4: Analyze the Wave Equations for good conductors, good dielectrics and evaluate the UPW Characteristics for several practical media of interest.
			CO5: To analyze completely the rectangular waveguides, their mode characteristics, and design waveguides for solving practical problems
12	II/II	**Analog and Digital Communications**	**CO1::**Analyze and design of various continuous wave and angle modulation and demodulation techniques
			CO2: Understand the effect of noise present in continuous wave and angle modulation techniques.
			CO3: Attain the knowledge about AM , FM Transmitters and Receivers
			CO4: Analyze and design the various Pulse Modulation Techniques.
			CO5: Understand the concepts of Digital Modulation Techniques and Baseband transmission
13	II/II	**Linear IC Applications**	**CO1:** Understand the internal operation of Op-Amp and its specifications.
			CO2: Analyze and design linear applications like adder, substractor, instrumentation amplifierand etc. using Op-Amp.

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			CO3: Analyze and design nonlinear applications like multiplier, comparator and etc, using Op-Amp.
			CO4: Attain the knowledge of functional diagrams and applications of IC 555 and IC565 and applications
			CO5: Acquire the knowledge about the Data converters.
14	**II/II**	**Electronic Circuit Analysis**	**CO1:** Analyze single stage amplifiers at Mid-band, Low frequency and High frequency regions
			CO2: Analyze multistage amplifiers at Mid-band, Low frequency and High frequency regions.
			CO3: Design and analyze different types of feedback amplifiers and oscillators using transistors
			CO4: Analyze different types of power amplifiers and compare them in terms of efficiency.
			CO5: Analyze tuned amplifiers and the effects of cascading tuned amplifiers
1	**II/II**	**Analog and Digital Communications Lab**	**CO1:**Analyze the spectrum of various analog modulation techniques
			CO2: Design a multiplexing system using FDM
			CO3: Examine various pulse modulation Techniques
			CO4: Analyze different digital modulation and demodulation
			CO5: Design Digital Modulation Techniques (FSK,PSK.BPSK)
16	**II/II.**	**IC Applications Lab**	**CO1**:Design analog circuits for practical applications using Op Amp IC-741
			CO2: Design and perform various mathematical operations like adder and subtract IC.s
			CO3: Design waveform generators and PLL circuits using ICs
			CO4: Design multi vibrators using IC555 and Schmitt trigger using IC741
			CO5: Analyze the practical applications of Voltage Regulator using various ICs.
17	**II/II**	**Electronic Circuits Analysis Lab**	**CO1:**Design, simulate and verify basic amplifier circuits
			CO2: Design, simulate and verify feedback amplifiers
			CO3: Design, simulate and verify oscillators.
			CO4:. Design, simulate and verify power amplifier circuits
			CO5: Design, simulate and verify Multivibrators and Sweep Circuits
18	**II/II**	**Gender Sensitization Lab**	**CO1:**Develop a better understanding of important issues related to gender in contemporary India.
			CO2: Analyze basic dimensions of the biological, sociological, psychological and legal aspects of gender.
			CO3: Develop a sense of appreciation of women in all walks of life and will be

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			equipped to work and live together as equals.
			CO4: Examine the new laws for women protection & relief, and empower students to understand and respond to gender violence
			CO5: Students will develop a sense of appreciation of women in all walks of life
19	**III/I**	**Microprocessors & Microcontrollers**	**CO1**: Understands the internal architecture, organization and assembly language programming of 8086 processors.
			CO2: Understands the internal architecture, organization and assembly language programming of 8051/controllers
			CO3: Understands the interfacing techniques to 8086 and 8051 based systems.
			CO4: Understands the internal architecture of ARM processors and basic concepts of advanced ARM processors.
			CO5: Classify the CORTEX and OMAP Processors
20	**III/I**	**Data Communications and Networks**	**CO1:**Analyze the Categories and functions of various Data communication Networks
			CO2: Design and analyze various error detection techniques
			CO3: Demonstrate the mechanism of routing the data in network layer
			CO4: Analyze the significance of various Flow control and Congestion control Mechanisms
			CO5: Analyze the Functioning of various Application layer Protocols.
21	**III/I**	**Control Systems**	**CO1**: Explain different ways of system representations such as Transfer function CO2: Apply various time domain and frequency domain techniques to assess the system performance
			CO3: Apply various control strategies to different applications like power systems, electrical drives etc
			CO4: Design various controllers and compensators to improve system performance
			CO5: Construct the State models for continuous & discrete time systems and comment on controllability and Observability of the system
22	**III/I**	**Business Economics & Financial Analysis**	**CO1:**Understand the various forms of business
			CO2:contrast of demand and supply
			CO3:change production, cost market structures and pricing
			CO4:study the firm's financial position

			CO5: Relate to analyze the financial statements of a company
23	**III/I**	**Electronic Measurements and Instrumentation**	**CO1**: Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
			CO2: Measure various physical parameters by appropriately selecting the transducers.
			CO3: Use various types of signal generators, signal analyzers for generating and analyzing Various real-time signals.
			CO4: Explain functioning, specification and applications of signal generators, signal analyzers for generating and analyzing various real-time signals.
			CO5: Design of various bridges and measurement of physical parameters
24	**III/I**	**Microprocessors & Microcontrollers Lab**	**CO1:** Write programs in assembly language using the instruction set of 8086 through MASM software as well as using 8086 Kit.
			CO2: Interface different I/O devices with 8086 and establish communication between them.
			CO3: Write programs in assembly language using instruction set of 8051 and execute the same.
			CO4: Verify the operations of the timer, counter and serial port (UART) of 8051.
			CO5: Design etectrical circuitry to the microcontroller i/o ports in order to interface the external devices
25	**III/I**	**Data Communications and Networks Lab**	**CO1:**Create and evaluate the performance of various LAN topologies
			CO2: Evaluate the performance of queue management, scheduling mechanisms and protocols
			CO3: Evaluate the performance of routing protocols and IEEE 802.x standards
			CO4: Analyze various protocols using packet capture monitoring tools.
			CO5: Analysis of HTTP,DNS and DHCP Protocols
	III/I	**Advanced**	**CO1:**Build sound vocabulary and use functional English effectively

26		**Communication Skills Lab**	**CO2:**Analyze the given text and respond appropriately and develop efficacious writing skills
			CO3: Develop effective speaking skills and maximize job prospects
			CO4: Plan and make different forms of presentation using various techniques.
			CO5: To communicate their ideas relevantly and coherently in writing.
27	III/II	**Antennas and Wave Propagation**	**CO1:** Explain radiation mechanism and various parameters of an antenna.
			CO2: Design Loop, Helical, Horn and Yagi–Udá antennas.
			CO3: Explain the working principle of Microstrip, Reflector and Lens antennas.
			CO4:. Design different types of arrays and explain the test procedures involved in Antenna Measurements.
			CO5: Explain the mechanisms of wave propagation and atmospheric effects on radio wave propagation
28	III/II	**Digital Signal Processing**	**CO1:** Understand the LTI system characteristics and Multirate signal processing
			CO2: Understand the inter-relationship between DFT and various transforms
			CO3: Design a digital filter for a given specification.
			CO4: Understand the significance of various filter structures and effects of round off errors
			CO5: To understand the fast computation of DFT and appreciate the FFT processing
29	III/II	**VLSI Design**	**CO1**: Explain MOS technology of NMOS, PMOS, CMOS and BiCMOS.
			CO2: Design stick diagrams and draw the layout of a logic circuit
			CO3: Analyze the architectural issues involved in subsystem design.
			CO4:. Design building blocks of data path subsystems and analyze simple memories using MOS transistors.
			CO5: Apply concepts of VLSI design methodology and explain the test principles
30	III/II	**Embedded System Design**	**CO1**: To understand the selection procedure of Processors in the embedded domain
			CO2: Design Procedure for Embedded Firmware.
			CO3: To visualize the role of Real time Operating Systems in Embedded Systems.
			CO4: To evaluate the Correlation between task synchronization and latency

			issues.
			CO5: To understand the necessity of operating systems in correlation with hardware systems.
31	**III/II**	**Disaster Preparedness planning Management**	**CO1**: Make managerial decisions for effective business administration.
			CO2: Explore various methods of work study and evaluate standard time
			CO3: Design various types of workspaces.
			CO4: Explain and implement various job evaluation methods.
			CO5: Evaluate the overall cost of production for a product.
32	**III/II**	**Digital Signal Processing Lab**	**CO1:**Generate sinusoidal and noise waveforms using different approaches
			CO2: Analyze Impulse and frequency response of various digital filters.
			CO3: Verify different algorithms of DSP through simulation
			CO4: Implement various DSP algorithms in hardware.
			CO5: Compute multirate digital signal processing
33	**III/II**	**e-CAD Lab**	**CO1:** Verify the functionality of digital circuits using Xilinx ISIM simulator
			CO2: Implement digital circuits on various FPGA boards using Xilinx tools
			CO3: Design layout for digital circuits and perform physical verification
			CO4: Analyze static timing, IR drop and crosstalk in digital circuit layouts
			CO5: Finite State machine design
34	**III/II**	**Scripting Languages Lab**	**CO1:**Design and test programs to solve mathematical problems
			CO2: Develop programs Using Ruby Script
			CO3: Develop Programs Using TCL Script
			CO4: Develop Programs Using Perl

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			Script
			CO5: To understand the perl script to substitute a word with another word in a string
35	**IV/I**	**Microwave and Optical Communications**	**CO1:** Analyze various modes of microwave transmission lines.
			CO2: Examine various waveguide components and their applications.
			CO3: Analyze the characteristics of O-type and M-type microwave tubes
			CO4: Estimate S-parameters of multiport junction devices
			CO5 Understand the mechanism of light propagation through Optical Fibers
36	**IV/I**	**Digital Image Processing**	**CO1:**Remember Upon completing this course, the student will be able to Explore the fundamental relations between pixels
			CO2: Understand utility of 2-D transforms in image
			CO3: Apply processer the enhancement, segmentation
			CO4: Analyze restoration processes on an image.
			CO5: Evaluate Implement the various Morphological operations on an image
37	**IV/I**	**Network Security and Cryptography**	**CO1:** Describe network security fundamental concepts and principles
			CO2: Encrypt and decrypt messages using block ciphers and network security technology and protocols
			CO3: Analyze key agreement algorithms to identify their weaknesses
			CO4: Identify and assess different types of threats, malware, spyware, viruses, vulnerabilitie
			CO5: Analyze about Key Management. Web Security
38	**IV/I**	**Java Programming**	**CO1:** Develop Programs with reusability.
			CO2: Develop programs to handle multitasking
			CO3: Develop programs to handle exceptions.
			CO4: Develop applications for a range of problems using object-oriented programming techniques.

			CO5: Design simple Graphical User Interface applications.
39	**IV/I**	**Professional Practice, Law & Ethics**	**CO1**:understand the importance of professional practice and Law Ethics
			CO2: Define the law of contract and its key elements of valid contract
			CO3:judge arbitration and conciliation and alternative Dispute resolution
			CO4: Explain the students rights and Responsibility as an Employee
			CO5: Create the need of compression and evaluation of basic compression algorithms.
40	**IV/I**	**Microwave and Optical Communications Lab**	**CO1**:Analyzethecharacteristicsofmicrowave sources and devices.
			CO2: Measure different parameters of various microwave devices.
			CO3: Measure the Scattering Parameters of various Tee Junctions
			CO4: Characterization of LEDs and LASER Diode
			CO5: To measure the numerical Aperture of Fiber Cable and to measure losses for optical link
41	**IV/I**	**Seminor**	**CO1:**Identify emerging topic specific to the programmer
			CO2: Extract the information relevant to the chosen topic.
			CO3: Deliver the knowledge using multimedia
			CO4: Answer the queries with appropriate explanation and elaboration.
			CO5: To evaluate the skills which is required for the topic
42	**IV/1**	**Project Stage - I**	**CO1:**Identify problem, conduct relevant literature survey and formalize it.
			CO2: Analyze & design efficient, cost-effective and eco-friendly solutions using relevant tools (if necessary) and processes
			CO3: Implement the design and demonstrate the functionality of developed model
			CO4: Evaluate the results to derive the conclusion and provide scope for future enhancement.

			CO5: Develop project report presentation skills .
43	**IV/11**	**Wireless Sensor Networks**	**CO1:** Describe the overview of wireless sensor networks and enabling technologies for wireless sensor networks
			CO2: Apply the design principles of WSN architectures and operating systems for simulating environment situations
			CO3: Apply various concepts for assignment of MAC addresses..
			CO4: Select the appropriate infrastructure, topology, joint routing and information aggregation for wireless sensor networks
			CO5: Analyze the sensor network platform and tools state-centric programming..
44	**IV/11**	**System on Chip Architecture**	**CO1:** Remember SOC Architectural features.
			CO2: Understand to acquire the knowledge on processor selection criteria and limitations
			CO3: Apply to acquire the knowledge on processor selection limitations
			CO4: Analyze to acquires the knowledge of memory architectures on SOC.
			CO5: Evaluate to the interconnection strategies on SOC.
45	**IV/11**	**Non Conventional Sources of Energy**	**CO1:** Describe the Importance of Renewable Energy sources such as solar, wind, biomass
			CO2: Compare various renewable energy sources. And Identify applications of different renewable energy sources.
			CO3: Demonstrate the schematics of renewable energy systems.
			CO4: Analyse and evaluate the implication of renewable energy. Concepts in solving numerical problems pertaining to solar radiation geometry and wind energy systems.
			CO5: Develop self-learning capability to design & establish renewable energy systems.
46	**IV/11**	**Project Stage – II**	**CO1:**Identify problem, conduct relevant literature survey and formalize it.
			CO2: Analyze & design efficient, cost-effective and eco-friendly solutions using relevant tools (if necessary) and processes
			CO3: Implement the design and demonstrate the functionality of developed model
			CO4: Evaluate the results to derive the conclusion and provide scope for future enhancement.

Computer Science Engineering I & II Sem Course Outcomes For The A.Y. 2021-2022			
S.No.	**Year/ Sem**	**Course Name**	**Course Outcomes**
			CO1: Ability to select the data structures that efficiently model the information in a problem.
			CO2: Ability to assess efficiency trade-offs among different data structure implementations orcombinations.
			CO3: Implement and know the application of algorithms for sorting and

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1	II/I	Data Structures	pattern matching.
			CO4: Design programs using a variety of data structures, including hash tables, binary and generaltree structures, search trees, tries, heaps, graphs, and AVL-trees
2	II/I	Computer Organization And Architecture	**CO1:** Understand the basics of instructions sets and their impact on processor design
			CO2: Demonstrate an understanding of the design of the functional units of a digital computer system
			CO3: Evaluate cost performance and design trade-offs in designing and constructing a computerprocessor including memory.
			CO4: Design a pipeline for consistent execution of instructions with minimum hazards.
			CO5: Recognize and manipulate representations of numbers stored in digital computers.
3	II/I	Object Oriented Programming Using C++	**CO1:** Able to develop programs with reusability
			CO2: Develop programs for file handling
			CO3: Handle exceptions in programming
			CO4: Develop applications for a range of problems using object-oriented programming techniques
4	II/I	Analog And Digital Electronics	**CO1:** Know the characteristics of various components
			CO2: Understand the utilization of components
			CO3: Design and analyze small signal amplifier circuits.
			CO4: Learn Postulates of Boolean algebra and to minimize combinational functions
			CO5: Design and analyze combinational and sequential circuits
			CO6: Know about the logic families and realization of logic gates.
5	II/I	Computer Oriented Statistical Methods	**CO1:** Apply the concepts of probability and distributions to some case studies
			CO2: Correlate the material of one unit to the material in other units
			CO3: Resolve the potential misconceptions and hazards in each topic of study
			CO4: To measure experimental result based on hypothesis using chi square techniques
6	II/I	Analog And Digital Electronics	**Co1:** Know the characteristics of various components.
			CO2: Understand the utilization of components.
			CO3: Design and analyze small signal amplifier circuits
			CO4: Postulates of Boolean algebra and to minimize combinational functions
			CO5: Design and analyze combinational and sequential circuits
7	II/I	Data Structure	**CO1:** Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.

		Lab	**CO2:** Ability to Implement searching and sorting algorithms
8	II/I	C++ LAB	**CO1:** Ability to develop applications for a range of problems using object-oriented programming techniques
9	II/I	Gender Sensitization Lab	**CO1:** To develop students' sensibility with regard to issues of gender in contemporary India.
			CO2: To provide a critical perspective on the socialization of men and women.
			CO3: To introduce students to information about some key biological aspects of genders.
			CO4: To expose the students to debates on the politics and economics of work.
			CO5: To help students reflect critically on gender violence
			CO6: To expose students to more egalitarian interactions between men and women
10	III/I	Computer Networks	**CO1:** Gain the knowledge of the basic computer network technology
			CO2: Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model
			CO3: Obtain the skills of sub netting and routing mechanisms
			CO4: Familiarity with the essential protocols of computer networks, and how they can be applied innetwork design and implementation.
11	III/I	Software Engineering	**CO1:** Ability to translate end-user requirements into system and software requirements, usfng e.g.UML, and structure the requirements in a Software Requirements Document (SRD).
			CO2: Identify and apply appropriate software architectures and patterns to carry out high level designof a system and be able to critically compare alternative choices.
			CO3: Will have experience and/or awareness of testing problems and will be able to develop a simpletesting report
12	III/I	Web Technologies	**CO1**: gain knowledge of client-side scripting, validation of forms and AJAX programming
			CO2: understand server-side scripting with PHP language
			CO3: understand what is XML and how to parse and use XML Data with Java
			CO4: To introduce Server-side programming with Java Servlets and JSP
13	III/I	Principles Of Programming Languages	**CO1:** Acquire the skills for expressing syntax and semantics in formal notation
			CO2: Identify and apply a suitable programming paradigm for a given computing application
			CO3: Gain knowledge of and able to compare the features of various programming languages
			CO4: Combine the constructs of programming structures with efficiently using oops, concurrency management and event handling
			CO5: Demonstrate the working of functional and logic programming

			language
14	III/I	Formal languages & Automate theory	**CO1:** Able to understand the concept of abstract machines and their power to recognize thelanguages
			CO2: Able to employ finite state machines for modeling and solving computing problems
			CO3: Able to design context free grammars for formal languages
			CO4: Able to distinguish between decidability and undecidability.
			CO5: Able to gain proficiency with mathematical tools and formal methods.
15	III/I	Information Retrieval Systems	**CO1:**Ability to apply IR principles to locate relevant information large collections of data
			CO2: Ability to design different document clustering algorithms
			CO3: Implement retrieval systems for web search tasks.
			CO4: Design an Information Retrieval System for web search tasks
16	III/I	Software Engineering Lab	**CO1:** Ability to translate end-user requirements into system and software requirements
			CO2: Ability to generate a high-level design of the system from the software requirements
			CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
17	III/I	CN&WT Lab	**CO1:** Implement data link layer farming methods
			CO2: Analyze error detection and error correction codes
			CO3: Implement and analyze routing and congestion issues in network design.
			CO4: Implement Encoding and Decoding techniques used in presentation layer
			CO5: To be able to work with different network tools
18	IV/I	Data Mining	**CO1:** Ability to understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
			CO2: Apply preprocessing methods for any given raw data.
			CO3: Extract interesting patterns from large amounts of data.
			CO4: Discover the role played by data mining in various fields
			CO5: Choose and employ suitable data mining algorithms to build analytical applications
			CO6: Evaluate the accuracy of supervised and unsupervised models and algorithms
19	IV-1	Cloud Computing	**CO1:**Ability to understand various service delivery models of a cloud computing architecture
			CO2: Ability to understand the ways in which the cloud can be programmed and deployed.
			CO3: Understanding cloud service providers.
			CO1: Gain knowledge of software economics, phases in the life cycle of software development,project organization, project control and

20	IV-I	Software Process & Project Management	process instrumentation
			CO2: Analyze the major and minor milestones, artifacts and metrics from management and technicalperspective
			CO3: Design and develop software product using conventional and modern principles of softwareproject management
21	IV-I	Priciples Of Programming Languages	**CO1:**Acquire the skills for expressing syntax and semantics in formal notation
			CO2: Identify and apply a suitable programming paradigm for a given computing application
			CO3: Gain knowledge of and able to compare the features of various programming languages

CSM I & II Sem Course Outcomes For The Academic Year 2021-2022

S.No.	Year/Sem	Course Name	Course Outcomes
1	II/I	Discrete Mathematics	**CO1:** Ability to understand and construct precise mathematical proofs.
			CO2: Ability to use logic and set theory to formulate precise statements
			CO3: Ability to analyze and solve counting problems on finite and discrete structures
			CO4: Ability to describe and manipulate sequences
			CO5: Ability to apply graph theory in solving computing problems
2	II/I	Data Structures	**CO1:** Ability to select the data structures that efficiently model the information in a problem.
			CO2: Ability to assess efficiency trade-offs among different data structure implementations or combinations.
			CO3: Implement and know the application of algorithms for sorting and pattern matching.
			CO4: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
3	II/I	Mathematical And Statistical Foundations	**CO1:** Apply the number theory concepts to cryptography domain
			CO2: Apply the concepts of probability and distributions to some case studies
			CO3: Correlate the material of one unit to the material in other units
			CO4: Resolve the potential misconceptions and hazards in each topic of study.
4	II/I	Computer Organization And Architecture	**CO1:** Understand the basics of instructions sets and their impact on processor design.
			CO2: Demonstrate an understanding of the design of the functional units of a digital computer system
			CO3: Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.

			CO4: Design a pipeline for consistent execution of instructions with minimum hazards.
			CO5: Recognize and manipulate representations of numbers stored in digital computers
5	**II/I**	**Python Programming**	**CO1:** Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
			CO2: Demonstrate proficiency in handling Strings and File Systems
			CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
			CO4: Interpret the concepts of Object-Oriented Programming as used in Python.
			CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
6	**II/I**	**Business Economics And Financial Analysis**	**CO1:** The students will understand the various Forms of Business and the impact of economic variables on the Business.
			CO2: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
			CO3: The Students can study the firm's financial position by analysing the Financial Statements of a Company.
7	**II/I**	**Data Structureslab**	CO1: Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
8	**II/II**	**Formal Languages And Automata Theory**	**CO1:** Able to understand the concept of abstract machines and their power to recognize the languages
			CO2: Able to employ finite state machines for modeling and solving computing problems.
			CO3: Able to design context free grammars for formal languages
			CO4: Able to distinguish between decidability and undecidability.
			CO5: Able to gain proficiency with mathematical tools and formal methods.
9	**II/II**	**Software Engineering**	**CO1:** Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
			CO2: Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
			CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
10	**II/II**	**Operating Systems**	**CO1:** Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
			CO2: Introduce the issues to be considered in the design and development

			of operating system
			CO3: Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix
11	**II/II**	**Database Management Systems**	**CO1:** Gain knowledge of fundamentals of DBMS, database design and normal forms
			CO2: Master the basics of SQL for retrieval and management of data.
			CO3: Be acquainted with the basics of transaction processing and concurrency control.
			CO4: Familiarity with database storage structures and access techniques
12	**II/II**	**Object Oriented Programming Using JAVA**	**CO1:** Able to solve real world problems using OOP techniques.
			CO2: Able to understand the use of abstract classes
			CO3: Able to solve problems using java collection framework and I/o classes.
			CO4: Able to develop multithreaded applications with synchronization.
			CO5: Able to develop applets for web applications
			CO6: Able to design GUI based applications
14	**II/II**	**DBMS LAB**	**CO1:** Gain knowledge of fundamentals of DBMS, database design and normal forms
			CO2: Master the basics of SQL for retrieval and management of data.
			CO3: Be acquainted with the basics of transaction processing and concurrency control.
15	**II/II**	**JAVA LAB**	**CO1:**Able to write programs for solving real world problems using java collection frame work
			CO2: Able to write programs using abstract classes.
			CO3: Able to write multithreaded programs
			CO4: Able to write GUI programs using swing controls in Java.
16	**II/II**	**OS LAB**	**CO1:**Simulate and implement operating system concepts s
			CO2: Able to implement C programs using Unix system calls

CSD I &II Sem Course Outcomes For The Academic Year 2021-2022

S.NO.	YEAR/SEM	COURSE NAME	Course Outcomes
1	**II/I**	**Discrete Mathematics**	**CO1:** Ability to understand and construct precise mathematical proofs.
			CO2: Ability to use logic and set theory to formulate precise statements
			CO3: Ability to analyze and solve counting problems on finite and discrete structures
			CO4: Ability to describe and manipulate sequences
			CO5: Ability to apply graph theory in solving computing problems
			CO1: Ability to select the data structures that efficiently model the information in a problem.
			CO2: Ability to assess efficiency trade-offs among different data structure implementations or combinations.

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2	II/I	Data Structures	**CO3:** Implement and know the application of algorithms for sorting and pattern matching.
			CO4: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
			CO5: Implement different data structure implementations or combinations.
3	II/I	Mathematical And Statistical Foundations	**CO1:** Apply the number theory concepts to cryptography domain
			CO2: Apply the concepts of probability and distributions to some case studies
			CO3: Correlate the material of one unit to the material in other units
			CO4: Resolve the potential misconceptions and hazards in each topic of study.
			CO5: Implement probability and distributions.
4	II/I	Computer Organization And Architecture	**CO1:** Understand the basics of instructions sets and their impact on processor design.
			CO2: Demonstrate an understanding of the design of the functional units of a digital computer system
			CO3: Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
			CO4: Design a pipeline for consistent execution of instructions with minimum hazards.
			CO5: Recognize and manipulate representations of numbers stored in digital computers
5	II/I	Python Programming	**CO1:** Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
			CO2: Demonstrate proficiency in handling Strings and File Systems
			CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
			CO4: Interpret the concepts of Object-Oriented Programming as used in Python.
			CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
6	II/I	Business Economics And Financial Analysis	**CO1:** The students will understand the various Forms of Business and the impact of economic variables on the Business.
			CO2: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
			CO3: The Students can study the firm's financial position by analysing the Financial Statements of a Company.
			CO4: Implement Production, Cost, Market Structure, Pricing aspects are learnt
			CO5: The Students can study the financial position by analysing the

			Financial Statements of a Company.
7	II/I	**Data Structures Lab**	**CO1:** Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
			CO2: Ability to Implement searching and sorting algorithms
8	II/I	**Python Programming Lab**	**CO3:** Student should be able to understand the basic concepts scripting and the contributions of scripting language
			CO4: Ability to explore python especially the object-oriented concepts, and the built in objects of Python.
			CO5: Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations
9	II/II	**Formal Languages And Automata Theory**	**CO1:** Able to understand the concept of abstract machines and their power to recognize the languages
			CO2: Able to employ finite state machines for modeling and solving computing problems.
			CO3: Able to design context free grammars for formal languages
			CO4: Able to distinguish between decidability and undecidability.
			CO5: Able to gain proficiency with mathematical tools and formal methods.
10	II/II	**Software Engineering**	**CO1:** Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
			CO2: Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
			CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
			CO4: Ability to structure the requirements in a Software Requirements Document (SRD).
			CO5: Design of a system and be able to critically compare alternative choices
11	II/II	**Operating Systems**	**CO1:** Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
			CO2: Introduce the issues to be considered in the design and development of operating system
			CO3: Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix.
			CO4: Will be able to control access to a computer and the files that may be shared.
			CO5: Demonstrate the knowledge of the components of computer and their respective roles in computing.
12	II/II	**Database**	**CO1:** Gain knowledge of fundamentals of DBMS, database design and normal forms
			CO2: Master the basics of SQL for retrieval and management of data.

		Management Systems	**CO3:** Be acquainted with the basics of transaction processing and concurrency control.
			CO4: Familiarity with database storage structures and access techniques
			CO5: Design th eEntity Relationship
13	**II/II**	**Object Oriented Programmin g Using JAVA**	**CO1**: Able to solve real world problems using OOP techniques.
			CO2: Able to understand the use of abstract classes
			CO3: Able to solve problems using java collection framework and I/o classes.
			CO4: Able to develop multithreaded applications with synchronization.
			CO5: Able to develop applets for web applications
14	**II/II**	**DBMS LAB**	**CO1**: Gain knowledge of fundamentals of DBMS, database design and normal forms
			CO2: Master the basics of SQL for retrieval and management of data.
			CO3: Be acquainted with the basics of transaction processing and concurrency control.
			CO4: Generate tables for a database
			CO5: Organize the data to prevent redundancy
15	**II/II**	**JAVA LAB**	**CO1**:Able to write programs for solving real world problems using java collection frame work
			CO2: Able to write programs using abstract classes.
			CO3: Able to write multithreaded programs
			CO4: Able to write GUI programs using swing controls in Java.
			CO5: Able to develop applets for web applications
16	**II/II**	**OS LAB**	**CO1**:Simulate and implement operating system concepts s
			CO2: Able to implement C programs using Unix system calls
			CO3: Will be able to control access to a computer and the files that may be shared.
			CO4: Demonstrate the knowledge of the components of computer and their respective roles in computing.
			CO5: Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix.
17	**III/I**	**Design and Analysis of Algorithms**	**CO1:** Ability to analyze the performance of algorithms
			CO2: Ability to choose appropriate data structures and algorithm design methods for a specified application
			CO3: Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs
			CO4: Apply non-linear data structures and their operations.
			CO5: Understand and apply greedy, divide and conquer algorithms.
18	**III/I**	**Introduction to Data Science**	**CO1:** Understand basic terms what Statistical Inference means.
			CO2: Identify probability distributions commonly used as foundations for statistical modelling. Fit a model to data
			CO3: describe the data using various statistical measures
			CO4: utilize R elements for data handling
			CO5: perform data reduction and apply visualization techniques.

19	III/I	Computer Networks	CO1: Gain the knowledge of the basic computer network technology.
			CO2: Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
			CO3: Obtain the skills of subnetting and routing mechanisms.
			CO4: Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.
			CO5:Demonstrate the transport layer protocol for reliable communication using end to end solution
20	III/I	DATA MINING	CO1: Ability to understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system..
			CO2: Apply preprocessing methods for any given raw data.
			CO3: Extract interesting patterns from large amounts of data.
			CO4: Discover the role played by data mining in various fields.
			CO5: Choose and employ suitable data mining algorithms to build analytical applications
27	III/I	Web Programming	CO1: Design web pages.
			CO2: Use technologies of Web Programming
			CO3: Apply object-oriented aspects to Scripting.
			CO4: Create databases with connectivity using JDBC.
			CO5: Build web-based application using sockets.
28	III/I	Information Retrieval Systems	CO1: Ability to apply IR principles to locate relevant information large collections of data
			CO2: Ability to design different document clustering algorithms
			CO3: Implement retrieval systems for web search tasks
			CO4: Design an Information Retrieval System for web search tasks.
			CO5: Apply IR principles to locate relevant information
29	III/I	Data Mining LAB	CO1: Apply preprocessing statistical methods for any given raw data.
			CO2: Gain practical experience of constructing a data warehouse.
			CO3: Implement various algorithms for data mining in order to discover interesting patterns from large amounts of data.
			CO4: Apply OLAP operations on data cube construction.
			CO5: Choose and employ suitable data mining algorithms to build analytical applications
30	III/I	Computer Networks LAB	CO1: Implement data link layer farming methods
			CO2: Analyze error detection and error correction codes.
			CO3: Implement and analyze routing and congestion issues in network design.
			CO4: Implement Encoding and Decoding techniques used in presentation layer
			CO5: To be able to work with different network tools

31	III/I	Advanced Communication Skills Lab	CO1:To improve the students fluency in English through a well developed vocabulary
			CO2:Further they would be required to communicate their ideas relevantly
			CO3:To prepare all the students for their placements
			CO4:Focus on skill development fostering ideas and practice of language skills
			CO5:Acquire basic proficiency in english including reading and listening comprehension writing and speaking skills
33	III/II	Compiler Design	CO1: Demonstrate the ability to design a compiler given a set of language features.
			CO2: Demonstrate the the knowledge of patterns, tokens & regular expressions for lexical analysis.
			CO3: Acquire skills in using lex tool & yacc tool for devleoping a scanner and parser.
			CO4: Design and implement LL and LR parsers
			CO5: Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity
34	III/II	Machine Learning	CO1: Understand the concepts of computational intelligence like machine learning
			CO2: Ability to get the skill to apply machine learning techniques to address the real time problems in different areas.
			CO3: Understand the Neural Networks and its usage in machine learning application.
			CO4: Solve the problems using various machine learning techniques
			CO5: Design application using machine learning techniques
35	III/II	Big Data Analytics	CO1: Ability to explain the foundations, definitions, and challenges of Big Data and various Analytical tools.
			CO2: Ability to program using HADOOP and Map reduce, NOSQL
			CO3:Ability to understand the importance of Big Data in Social Media and Mining.
			CO4: Ability to explain the foundations, definitions and challenges of Big data
			CO5: Importance of Big Data in Social Media and Mining.
36	III/II	Software Testing Methodologies	CO1: : Design and develop the best test strategies in accordance to the development model
			CO2: Design software testing specifications for given problems
			CO3: Apply quality management concepts at the application level.
			CO4: Design test strategies in accordance to the development model
			CO5: Apply Design software testing methodologies specifications for given problems
37	III/II	Machine Learning Lab	CO1: understand complexity of Machine Learning algorithms and their limitations;
			CO2:understand modern notions in data analysis-oriented computing;

			CO3: Be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;
			CO4: Be capable of performing experiments in Machine Learning using real-world data.
			CO5: Design application using machine learning techniques
38	III/II	Big Data Analytics Lab	CO1: Use Excel as an Analytical tool and visualization tool.
			CO2: Ability to program using HADOOP and Map reduce.
			CO3:Ability to perform data analytics using ML in R
			CO4: Use cassandra to perform social media analytics.
			CO5: Importance of Big Data in Social Media and Mining.
39	III/II	Software Testing Methodologies Lab	CO1: Design and develop the best test strategies in accordance to the development model.
			CO2: Design software testing specifications for given problems
			CO3: Apply quality management concepts at the application level.
			CO4: Design test strategies in accordance to the development model
			CO5: Apply Design software testing methodologies specifications for given problems

MBA Course outcomes for the Academic year 2021-2022

PROGRAMME: MBA	DEGREE: PG	A.Y: 2021-22	SEMESTER: I, II ,III, IV
S.No	Year/ Sem	Course Name	Course Outcomes
1	I-I	Management Organizational Behaviour	CO1: To understand the various attitude and personalities and perceptions and leadership and motivation and apply in organizational situations
			CO2:To evaluate the management and contribution of management thinkers
			CO3: To apply the relevance of environmental scanning ,planning and to take decisions
			CO4: To interpret the individual and interpersonal behavior process for team building and group behavior development
			CO5: To analyze the organizing and controlling
2	I-I	Business Economics	CO1: To understand and learn the basics of economic principles in business
			CO2:To illustrate determinants of supply and demand and Demand Analysis and Forecasting
			CO3: To develop production and cost estimates
			CO4: To analyze the market structure
			CO5: To develop the pricing strategies

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3	I-I	**Financial Accounting Analysis**	**CO1:** To understand the basic concepts of financial accounting
			CO2: To summarize preparation of financial statement
			CO3: To develop the inventory valuation
			CO4: To analyze the accounting process
			CO5: To understand the interpretation of accounting concepts

4	I-I	**Research& methodology Statistical Analysis**	**CO1:** To understand and learn basics of Research, Process of Research and elements of research Proposal
			CO2: To apply the various simple and advanced statistical tools
			CO3: To analyze the features and good research design
			CO4: To apply the principals of research methodology for various projects
			CO5: To understand the time series analysis and report writing
5	I-I	**Legal and Business Environment**	**CO1:** To understand all important legal provisions pertaining to Business Laws
			CO2: To Known the business laws related to incorporating a company
			CO3: To understand all important legal regulatory frame work in India
			CO4: To analyze the Law of Contract
			CO5: To develop the negotiable instruments
6	I-I	**Project management**	CO1:Undestands the importance in managing projects with a special focus
			CO2:to understand project planning execution, monitoring and evaluation .
			CO3: students will b able to understand importance of project management
			CO4:Analyse the role of the project planning, execution ,and implementation.
			CO5: Explains the significance of terms in projects

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7	I-I	**Business Communication Lab**	**CO1:** To provide an overview of Prerequisites to Business Communication. .
			CO2: To provide an outline to effective Organizational Communication.
			CO3: To impart the correct practices of the strategies of Effective Business writing.
			CO4: TO Discuss the importance of ethical communication Ethics in Business Communication
			CO5: TO Evaluate and practice methods of analysis to assess the quality and reliability of a source
8	I-I	**Statistical Data Analysis Lab**	**CO1:** To understand the importance of project management
			CO2: To apply the project planning and execution and implementation
			CO3: To develop the significance of teams in projects
			CO4: To analyze the project evaluation techniques
			CO5: To evaluate the organizational behavior in project management
9	I-II	**Human Resource Management**	**CO1:** Explain Nature of HRM, Scope, Functions and Objectives, HRM Policies and practices.
			CO2: Understand SHRM Model
			CO3: Design Human Resource Planning
			CO4: Implement Recruitment & Selection through different sources & tests
			CO5: Make Career Planning
10	I-II	**Marketing Management**	**CO1:** Explain New Product Development & Product Life Cycle
			CO2: Explain Factors influencing pricing decisions
			CO3: Differentiate Product Vs. Brand
			CO4: Illustrate Selecting pricing method, Selecting final price.
			CO5: Explain Wholesaling, Retailing, Franchising, Direct marketing ,Ecommerce Marketing Practices

11	I-II	**Financial Management**	**CO1:** Explain the basic concept of financial management.
			CO2: Apply the tools from financial management this would facilitate the decision making i.e. Capital Budgeting, Ratio Analysis
			CO3: develop analytical skills this would facilitate the decision making in business situations
			CO4: Explain and use of financial analysis techniques i.e. Fund Flow, Cash Flow.
			CO5: Estimate working capital requirement of Business concern
12	I-II	**Quantitative Analysis For Business Decisions**	**CO1:** Explain Importance of Decision Sciences & Role of quantitative techniques In decision making
			CO2: Solve numerical on Assignment Models including special cases in Assignment models.
			CO3: Solve numerical on Transportation Models by North West Corner method, Least Cost method, VAM method and Optimal Solution by using MODI Method
			CO4: Solve numerical on Linear Programming problems by graphical

			method
			CO5: Solve numerical on Markov Chains & Simulation Techniques
13	**I-II**	**Logistics Supply Chain Management**	**CO1:** Explain the importance, scope and functions of Operations and Supply Chain Management in Present Scenario
			CO2: Explain the term Quality and can related different dimensions of Quality affecting customer satisfaction.
			CO3: Explain different operations processes , and identify different types of process-product matrix
			CO4: Prepare a service blue print for given service providing organization
			CO5: Demonstrate the Production Planning and Control and its functions for effective and efficient operations management
14	**I-II**	**Entrepreneurship**	**CO1:** understand the nature of entrepreneurship
			CO2:understand the function of the entrepreneur in the successful, commercial application of innovations
			CO3: confirm an entrepreneurial business idea
			CO4: identify personal attributes that enable best use of entrepreneurial opportunities
			CO5: understand the function of the entrepreneur in the successful

15	**I-II**	**Total quality management**	**CO1:** understand the quality concepts to total quality management
			CO2:to facilitate students understand the quality tools and techniques related to total quality management
			CO3: student will be able to understand importance of quality
			CO4: To know about principles and practices of TQM
			CO5: write about the tools and techniques in quality management
16	**II-II**	**Strategic Investment & Financing Decisions**	**CO1:** Understand the risk, uncertainty, risk analysis in investment decisions, risk adjusted rate of return and certainty equivalents.
			CO2: .Enumerate the investment decisions under capital constraints like capital rationing, portfolio risk and diversified projects.
			CO3: Explain the concept of multiple internal rate of return, Modified internal rate of return, pure, simple and mixed investments
			CO4: Determine the Lorie savage paradox, adjusted net present value and know the impact of inflation on capital budgeting decisions.
			CO5: Discuss the concepts of lease financing, leasing Vs. Operating risk, borrowing vs. procuring, hire purchase and installment purchase decisions
17	**II-I**	**Production Operations Management**	**CO1:** Gaining knowledge about managing production processes
			CO2: How to run operations effectively.
			CO3: Better understanding of modern production techniques
			CO4: Better understanding of quality management
			CO5: You will learn about practical applications of operations management to plan for the future
18	**II-I**	**Manageme**	**CO1:** Acquire on job the skills, knowledge, attitudes, and perceptions along

		nt Informatio n system	with the experience needed to constitute a professional identity.
			CO2: .Get actual supervised professional experiences.
			CO3: Get insight into the working of the real organizations
			CO4: Develop perspective about business organizations in their totality
			CO5: Explore career opportunities in their areas of interest.

19	**II-I**	**Data Analytics**	**CO1:** Data will be collected around the business case after careful evaluation of the business case in a particular domain.
			CO2:A Database with the data collected in the above step will be created using SQL.
			CO3: Connect the SQL database with Tableau/ Python/ R and extracting this data into environments
			CO4: Preparation of reports based on the business objective and context
			CO5: Building the dashboard using Tableau/ Power BI
20	**II-II**	**Risk Manageme nt & Financial Derivatives**	**CO1:** Be able to describe standard derivative contracts, their properties and functionality
			CO2: Be able to understand and apply scientific methods for valuation of options and other derivatives, in continuous and discrete time.
			CO3: Be able to interpret and apply risk measures that are commonly used in risk management.
			CO4: Be able to reflect over and critically survey different assumptions and principles behind derivatives pricing and risk management.
			CO5: Demonstrate an understanding of pricing forwards, futures and options contracts
21	**II-I**	**Security Analysis Portfolio Manageme nt**	**CO1:** Explored to different avenues of investment.
			CO2: Equipped with the knowledge of security analysis.
			CO3: apply the concept of portfolio management for the better investment
			CO4: invest in less risk and more return securities
			CO5: Encourage students to apply stock and option valuation models in portfolio management
22	**II-I**	**Financial Institutions Markets & Services**	**CO1:** Understand the role and function of the financial system in reference to the macro economy
			CO2: .Demonstrate an awareness of the current structure and regulation of the Indian financial services sector
			CO3: Evaluate and create strategies to promote financial products and services.
			CO4: To enrich student's understanding of the fundamental concepts and working of financial service institutions
			CO5: To equip students with the knowledge and skills necessary to become employable in the financial service industry

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Kondapur, Ghatkesar Municipality, Medchal (D)

23	II-I	**Strategic Management Accounting**	**CO1:** Explain how management accounting information is used in strategic decision making.
			CO2: Illustrate the process of strategy formulation, communication, implementation and control within an organization.
			CO3: Explain how to integrate conventional and contemporary management accounting techniques into a strategic management accounting framework
			CO4: Solve practical and applied problems by using research papers and case study analysis
			CO5: Identify and evaluate the business strategies of contemporary organisations, based on an understanding of their internal and external environments;
24	II-I	**Performance Management Systems**	**CO1:** Setting and defining goals to fulfill company objectives
			CO2: Setting the right expectations for managers and employees
			CO3: Effective communication between individuals and teams
			CO4: Determining individual training and performance plans
			CO5: Determining individual training and performance plans
25	II-I	**Learning & Development**	**CO1:** To develop an understanding of the evolution of training & development from a tactical to a strategic function
			CO2: .To provide an insight into what motivates adults to learn and the most appropriate methodologies to impart training
			CO3: To understand the concept of training audit & training evaluation
			CO4: To learn how design a training module and execute it
			CO5: To understand various strategies used by organizations to measure performance & reward for the same
26	II-I	**Management of Industrial Relations**	**CO1:** Students should able to elaborate the concept of Industrial Relations
			CO2: The students should able to illustrate the role of trade union in the industrial setup
			CO3: Students should able to outline the important causes & impact of industrial disputes.
			CO4: Students should able to elaborate Industrial Dispute settlement procedures.
			CO5: Student should be able to summarize the important provisions of Wage Legislations, in reference to Payment of Wages Act 1936, Minimum Wages Act 1948 & Payment of Bonus Act 1965

27	II-I	**Digital Marketing**	**CO1:**Develop the applications of digital marketing in the globalized market
			CO2: Explain Channels of Digital Marketing
			CO3: Identify the digital marketing plan
			CO4: create Search engine marketing
			CO5: Analyze the Online Advertising
28	II-II	**Customer Relationship Management**	**CO1:**what is the need of CRM
			CO2: Determin the building customer relations
			CO3: Review of CRM process
			CO4:write about CRM structures
			CO5: Develop the Planning and Implementation of CRM

29	II-I	Advertising and Sales Management	CO1:write about Visualization of Advertising Layout
			CO2:Identify the evaluation of advertising effectiveness
			CO3: Understand the process of sales management
			CO4: describe the sales promotion
			CO5: Evaluate the need for distribution channels and managing them.
30	II-I	Consumer Behaviour	**CO1**: Demonstrate how knowledge of consumer behaviour can be applied to marketing.
			CO2:Identify and explain factors which influence consumer behavior
			CO3: Relate internal dynamics such as personality, perception, learning motivation and attitude to the choices consumers make.
			CO4: Use appropriate research approaches including sampling, data collection and questionnaire design for specific marketing situations
			CO5: In a team, work effectively to prepare a research report on consumer behaviour issues within a specific context.

31	II-I	Summer Internship	**CO1:** Acquire on job the skills, knowledge, attitudes, and perceptions along with the experience needed to constitute a professional identity
			CO2: Get actual supervised professional experiences
			CO3: Get insight into the working of the real organizations
			CO4: Develop perspective about business organizations in their totality
			CO5: Explore career opportunities in their areas of interest
32	II-II	International Marketing	**CO1**:Explain the Global Marketing Management
			CO2: Undatand the concept ofEnvironment of global markets
			CO3:Analyze Assessing Global Market Opportunities
			CO4:Developing and Implementing Global Marketing Strategies
			CO5: Select the E-Marketing channels organization &controlling of the global marketing programme
33	II-II	Strategic Management	**CO1:** Explain the importance, scope and concept of Strategy and Strategic Management Process
			CO2: .differentiate between Tactics, Strategies and Planning and importance of each component in Strategic Management
			CO3: Prepare Vision, Mission statements and define goals, objectives for Organization
			CO4: Identify Critical Success Factors. Key Performance Indicators and Key Result Areas for any given service sector
			CO5: Demonstrate the importance of external environmental analysis as well prepare PESTLE Analysis and ETOP model for decision making
34	II-II	International Human Resource Management	**CO1:** Describe the role of the HR Manager in an International context
			CO2: .Describe Human Resource activities in an International Context
			CO3: List and explain the differences between domestic and international HRM
			CO4: Explain the importance of cultural sensitivity in an international assignment

		investment and financial decisions	**CO2:** write resources allocation decision with in a organization
			CO3: students will be able to understand investment decisions in risk and uncertainty
			CO4: Explain strategic investment decisions
			CO5: To understand investment appraisal techniques
41		**Risk management and financial derivatives**	**CO1:** Write the concept of risk management
			CO2: Explain measurements and risk management strategies
			CO3: Explain risk management using forward and features
			CO4: Explain risk management measurement
			CO5: To understand risk management using options and swaps

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			CO5: Critically appraise the impact of cultural and contextual factors in shaping human resource practices in MNCs

35	**II-II**	**Leadership and Change Management**	**CO1:** Can explain how the particular context of public organizations influences change management and leadership.
			CO2: Is able to apply the key concepts of this course in a systematic analysis of an organizational change process in a public organization
			CO3: Has developed the ability to stay informed about current leadership developments and trends through online resources and networks
			CO4: Can describe the characteristics of central change management approaches and leadership theories
			CO5: Is able to formulate and effectively communicate a change vision in an organizational setting.
36	**II-II**	**Talent and Knowledge Management**	**CO1:** Evaluate the potential and appropriateness of talent development strategies, policies and methods with reference to relevant contextual factors.
			CO2: .Assess the role and influence the politics of knowledge management policy and practice in a range of contexts
			CO3: Express the nature of knowledge management alternative views of knowledge, types of knowledge and concept of location of knowledge
			CO4: Examine the purpose of developing a talent management information strategy and the role of leaders in talent management
			CO5: Express the nature of knowledge management alternative views of knowledge, types of knowledge and concept of location of knowledge
37	**II-II**	**Services Marketing**	CO1: Identify Marketing Management of companies offering Services
			CO2:describe the Characteristics of services
			CO3: understand consumer behaviour in services
			CO4: Collect align service design and standards
			CO5: Correlate the delivering service and managing services promises.
38	**II-II**	**International Financial Management**	**CO1:** Understand international capital and foreign exchange market
			CO2: Identify and appraise investment opportunities in the international environment.
			CO3: Identify risk relating to exchange rate fluctuations and develop strategies to deal with them
			CO4: Develop strategies to deal with other types of country risks associated with foreign operations
			CO5: Express well considered opinion on issues relating to international financial management.
39	**II-II**	**Customer relationship management**	**CO1:** Explain the importance of CRM
			CO2: To understand nee of CRM
			CO3: Express CRM process
			CO4:understand CRM structure
			CO5: To plan and implementation of CRM
40	**II-II**	**Strategic**	**CO1:** TO understand and develop the role of financial strategy