BVRIT HYDERABAD

College of Engineering for Women

Rajiv Gandhi Nagar, Bachupally, Hyderabad -90

Department of Electrical and Electronics Engineering

Course Outcomes for R22 Regulation I-Semester			
I Year I Sem			
Course Code	**Course Name**	**CO. No.**	**Course Outcomes**
C111	**MATRICES AND CALCULUS (MA101BS)**	**C111.1**	Solve the system of linear equations using appropriate methods
		C111.2	Analyze the nature of quadratic form using eigen values and eigen vectors
		C111.3	Derive infinite series expansions of differentiable functions using generalized mean value theorems
		C111.4	Evaluate improper integrals using Beta and Gamma functions
		C111.5	Optimize a given function with respect to given constrains
		C111.6	Estimate area or volumes of few geometries using multiple integration
C112	**ENGINEERING CHEMISTRY (CH102BS)**	**C112.1**	Analyze the basic properties of water and its usage in domestic and industrial purposes.
		C112.2	Inspect the working principles and reaction mechanisms of various energy storage devices
		C112.3	Acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
		C112.4	Impart the fundamental knowledge and sustainability implemented through smart engineering materials.
		C112.5	Distinguish various energy sources to prioritise eco friendly fuels for environmental sustainable development.
		C112.6	Discriminate the limitations of conventional basic engineering materials for developing multiphase materials.
C113	**C PROGRAMMING AND DATA STRUCTURES (EE103ES)**	**C113.1**	Explore the basic constructs of C Programming Language.
		C113.2	Implement control structures & apply the concepts of modular programming.
		C113.3	Develop C programs to demonstrate the applications of derived data types such as arrays and pointers
		C113.4	Apply the knowledge of various string handling functions.
		C113.5	Explore user defined data types and file handling functions using C.
		C113.6	Describe Linear data structures used for problem solving.
C114	**ELECTRICAL CIRCUIT ANALYSIS-I (EE105ES)**	**C114.1**	Analyze DC electrical networks using different approaches.
		C114.2	Analyze AC electrical networks using different approaches.
		C114.3	Solve the DC electrical circuits using various theorems.
		C114.4	Solve the AC electrical circuits using various theorems.
		C114.5	Analyze the Poly phase circuits for both balanced and unbalanced loads.
		C114.6	Analyze magnetic circuits and form Dual Networks.

C115	**COMPUTER AIDED ENGINEERING GRAPHICS (ME105ES)**	**C115.1**	Construct different types of non circular curves and scales used in various engineering applications.
		C115.2	Analyze the projections of points and lines.
		C115.3	Analyze the projections of planes and solids.
		C115.4	Apply different types of sectional planes to get the interior features of the objects by means of sectional views
		C115.5	Develop the surfaces to fabricate the objects.
		C115.6	Identify orthographic, Isometric projections and various CAD commands.
C116	**ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING (EE106ES)**	**C116.1**	Verify the basic Electrical circuits with theorems.
		C116.2	Perform experiments on three phase systems.
		C116.3	Perform experiments on basic electronic circuits.
		C116.4	Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods.
C117	**ENGINEERING CHEMISTRY LABORATORY (CH107BS)**	**C117.1**	Analysis of materials using small quantities of materials involved for quick and accurate results
		C117.2	Interpret a new application by the analysis of physical principle involved in various instruments.
		C117.3	Develop experimental skills in building technological advances by qualitative and quantitative analysis of materials.
		C117.4	Learn and apply basic techniques used in chemistry laboratory for preparation, purification and identification.
C118	**C PROGRAMMING AND DATA STRUCTURES LABORATORY (EE108ES)**	**C118.1**	Build programs using control structures to solve simple mathematical problems
		C118.2	Develop modular and readable C Programs.
		C118.3	Solve problems using derived, user defined data types and files
		C118.4	Implement linear data structures concepts.
Course Outcomes for R18 Regulation I-Semester			
II Year I Sem			
Course Code	**Course Name**	**CO. No.**	**Course Outcomes**
C211	ENGINEERING MECHANICS (EE301ES)	**C211.1**	Solve the resultant of a system of forces.
		C211.2	Distinguish the equilibrium of concurrent and non-concurrent system of forces.
		C211.3	Analyze the effect of friction on plane of motion.
		C211.4	Identify the centroid and center of gravity of the objects.
		C211.5	Analyze the area moment of inertia and mass moment of inertia.
		C211.6	Interpret the principles of kinetics.
C212	ELECTRICAL CIRCUIT ANALYSIS (EE302PC)	**C212.1**	Deduce the responses of complex electric networks using circuit theorems.
		C212.2	Analyze the transient response of electric circuits using classical and Laplace transform methods.
		C212.3	Analyze single phase and 3-phase AC electric circuits.
		C212.4	Analyze a coupled circuit using the concepts of Magnetic circuits.
		C212.5	Calculate two-port network parameters and their inter-relationships for electrical networks.

		C212.6	Compute parameters of electrical resonance for composite electric circuits
C213	ANALOG ELECTRONICS (EE303PC)	**C213.1**	Analyze the characteristics of PN junction diode and its Applications
		C213.2	Evaluate the characteristics of MOSFET Amplifiers.
		C213.3	Build different types of multistage amplifiers based on specifications
		C213.4	Design various types of Power Amplifiers.
		C213.5	Categorize different feedback amplifier circuits
		C213.6	Design various analog circuits using IC 741 Op-Amp
C214	ELECTRICAL MACHINES-I (EE304PC)	**C214.1**	Assess the characteristics for different types of DC machines.
		C214.2	Compute losses and efficiency of DC machines.
		C214.3	Evaluate the types of starters and speed control techniques of DC motors.
		C214.4	Illustrate the equivalent circuit parameters for single phase transformer.
		C214.5	Evaluate the performance of Transformers under different loading conditions.
		C214.6	Distinguish poly phase transformers based on connections.
C215	ELECTROMAGNETIC FIELDS (EE305PC)	**C215.1**	Illustrate the concepts of electromagnetic field theory using fundamental laws
		C215.2	Examine the influence of electric fields on conductors, insulators and dielectrics.
		C215.3	Compute the Magneto static parameters using Biot Savart's and Ampere's circuital laws for different conductor configuration.
		C215.4	Calculate Force, Torque and inductance in magnetic fields for electrical engineering applications.
		C215.5	Interpret the concepts of Maxwell's equations from electromagnetic fields.
		C215.6	Understand the propagation of EM waves in different medium
C216	ELECTRICAL MACHINES LAB -I (EE306PC)	**C216.1**	Examine the performance characteristics of DC generators
		C216.2	Compute the losses and efficiency of DC machines.
		C216.3	Outline the performance curves of DC motors.
		C216.4	Estimate the moment of inertia of a DC motor.
C217	ANALOG ELECTRONICS LAB (EE307PC)	**C217.1**	Analyze the characteristics of different practical diodes and also different Transistor configurations
		C217.2	Design analog circuits for practical applications using Op Amp IC-741
		C217.3	Analyze the gain and bandwidth of different practical amplifier circuits.
		C217.4	Measure the frequency of different oscillator circuits.
C218	ELECTRICAL CIRCUITS LAB (EE308PC)	**C218.1**	Examine the response of electric networks using circuit theorems.
		C218.2	Assess the inductance and power of a given electrical network.
		C218.3	Calculate two port network parameters for a given electrical network.
		C218.4	Analyze harmonics in a given waveform.
C219	GENDER SENSITIZATION LAB	**C219.1**	Develop a better understanding of important issues related to gender in contemporary india.

	(MC309)	**C219.2**	Analyze basic dimensions of the biological, sociological, psychological and legal aspects of gender
		C219.3	Develop a sense of appreciation of women in all walks of life and will be equipped to work and live together as equals.
		C219.4	Examine the new laws for women protection & relief, and empower students to understand and respond to gender violence.
III Year I Sem			
C311	POWER ELECTRONICS (EE502PE)	**C311.1**	Analyze the characteristics and working of power semiconductor devices.
		C311.2	Assess the power electronic converters for AC/DC conversion
		C311.3	Evaluate control techniques and protection schemes for power electronic devices
		C311.4	Assess the power electronic converters for AC/AC conversion
		C311.5	Determine performance parameters of dc-dc converters by applying control strategies.
		C311.6	Illustrate various control techniques for thyristor and transistor based inverters
C312	POWER SYSTEMS-II (EE502PE)	**C312.1**	Examine performance of transmission lines using equivalent circuit models.
		C312.2	Elucidate various voltage control and compensation techniques for power system network
		C312.3	Determine per unit quantities for power system networks.
		C312.4	Categorize over voltage protection schemes.
		C312.5	Illustrate insulation coordination for power system protection.
		C312.6	Assess the effects of symmetrical and unsymmetrical faults on the power system networks.
C313	MEASUREMENTS & INSTRUMENTATION (EE503PE)	**C313.1**	Categorize measuring instruments based on their construction and their operating principle
		C313.2	Analyze the various types of potentiometers
		C313.3	Assess the errors in instrument transformer with relevant solution
		C313.4	Measure Resistance, Capacitance, Inductance, Power and energy
		C313.5	Analyze the different types of transducers
		C313.6	Measure various quantities using Digital meters
C314	COMPUTER ARCHITECTURE (EE511PE)	**C314.1**	Understand the basics of organizational and architectural issues of a digital computer and classify and compute the performance of machines, Machine Instructions.
		C314.2	Learn about various data transfer techniques in digital computer and the I/O interfaces
		C314.3	Estimate the performance of various classes of Microprocessors, build large memories using small memories for better performance and relate to arithmetic for ALU implementation with 8086
		C314.4	Understand the basics of hardwired and micro-programmed control of the CPU, pipelined architectures, Hazards and Superscalar Operations.
		C314.5	Identify the various architectures deals with processors
		C314.6	Organize modern Computer system with real time examples
C315	HIGH VOLTAGE	**C315.1**	Examine breakdown mechanisms in different states of matter.

	ENGINEERING (EE512PE)	**C315.2**	Analyze the circuits used to generate high voltages
		C315.3	Analyze the circuits used to measure high voltages and currents.
		C315.4	Understand the protection mechanism using various devices
		C315.5	Understand IS,IEC standards required for testing of high voltage apparatus
		C315.6	Illustrate the procedures for testing of apparatus at high voltages
C316	ELECTRICAL MACHINE DESIGN (EE513PE)	**C316.1**	Analyze the Major considerations of Electrical Machine Design
		C316.2	Apply considerations of Electrical Machine Design in Designing Transformers
		C316.3	Apply considerations of Electrical Machine Design in Designing Induction Motor
		C316.4	Apply considerations of Electrical Machine Design in Designing Synchronous Machines
		C316.5	Optimize traditional Electrical Machine design using CAD
		C316.6	Design Modern Electrical Machines using CAD
C317	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS (SM504MS)	**C317.1**	Understand the Economic Concepts in Business Decision making process
		C317.2	Familiarize with the cost concepts, market structures.
		C317.3	Make use of breakeven analysis, CVP Analysis, pricing strategies.
		C317.4	Examine Financial accounting and analyze various financial statements.
		C317.5	Examine Ratios and to interpret various financial statements by applying different types of ratios.
		C317.6	Examine the usefulness of funds flow statement and cash flow statement for better managerial decisions.
C318	POWER SYSTEM SIMULATION LAB (EE505PC)	**C318.1**	Compute transmission line parameters of three phase transmission line
		C318.2	Analyze the importance of time constants in various circuits
		C318.3	Predict tariff based on load curve
		C318.4	Compute string efficiency of an insulator
C319	POWER ELECTRONICS LAB (EE506PC)	**C319.1**	Examine the characteristics of SCR, MOSFET and IGBT
		C319.2	Analyze different techniques to Turn-on and Turn-off an SCR
		C319.3	Analyze power electronic converters by varying gate pulses.
		C319.4	Design Power Electronic converters using simulation tools
C31A	MEASUREMENTS AND INSTRIMENTATION LAB (EE507PC)	**C31A.1**	Determine unknown electrical parameters using bridges
		C31A.2	Measure active and reactive power using various methods
		C31A.3	Calibrate various measuring instruments.
		C31A.4	Examine electrical parameters and characteristics of electrical instruments.
C31B	ADVANCED COMMUNICATION SKILLS LAB (EN508HS)	**C31B.1**	Build sound vocabulary and use functional English effectively
		C31B.2	Analyze the moral issues in Profession by understand basic theories of Ethics.
		C31B.3	Make use of moral values and enhance professional conduct in Engineering profession
		C31B.4	Make use of Rights & Responsibilities of Engineers at Workplace.

C31C	INTELLECTUAL PROPERTY RIGHTS (*MC510)	**C31C.1**	Understand the fundamental aspects of Intellectual property Rights who are going to play a major role in development and management of innovative projects in industries.
		C31C.2	Examine Trademarks, Acquisition of Trade Mark Rights and its registration processes.
		C31C.3	Evaluate various aspects relating to copyrights and its procedure for registration processes.
		C31C.4	Evaluate with the Trade Secret Law, protection for submission, Unfair Competition.
		C31C.5	Evaluate on the International Developments in Intellectual Property Rights.
		C31C.6	Interpret about current trends in IPR and the steps taken by the Government of India in fostering IPR.
C31D	ARTIFICIAL INTELLEGANCE ()	**C31D.1**	Possess the ability to formulate an efficient problem space for a problem expressed in English
		C31D.2	Possess the ability to select a search algorithm for a problem and characterize its time and space complexities
		C31D.3	Possess the skill for representing knowledge using the appropriate technique for a given problem
		C31D.4	Apply and evaluate AI techniques to solve problems of Machine learning and Natural Language Processing
		C31D.5	Choose and implement appropriate learning algorithms for a given problem.
		C31D.6	Create an expert system to simulate behavior of a person
IV Year I Sem			
C411	UTILIZATION OF ELECTRICAL ENERGY (EE700OE)	**C411.1**	Categorize the electric heating methods based on nature of charge.
		C411.2	Assess welding methods based on properties of metals.
		C411.3	Design lighting schemes for given specifications.
		C411.4	Evaluate speed time curves for different services.
		C411.5	Determine specific energy consumption of electric locomotives for a given run
		C411.6	Analyzing the Special Requirements of train lightings
C412	ELECTRIC DRIVES AND CONTROL (EE701OEEE702PC)	**C412.1**	Understand the basics of electric drive configuration.
		C412.2	Analyze the dynamics of Electric Drives
		C412.3	Apply the concepts of Power Electronics converters to control the speed of DC Motor
		C412.4	Explain various control techniques used to control the speed of Induction Motor Drives
		C412.5	Analyze different braking modes of Induction Motor Drives for specific control requirements
		C412.6	Apply the principles of energy conservation to Electric Drives.
C413	DIGITAL CONTROL SYSTEMS (EE711PE)	**C413.1**	Analyze the discrete representations of continuous time systems
		C413.2	Analyze Z-transform & map the Z-plane to S-plane
		C413.3	Analyze the stability of discrete time control systems
		C413.4	Analyze the controllability & observability of discrete time systems through state space approach
		C413.5	Design the state feedback controllers through various methods

		C413.6	Design the output feedback controllers through various methods
C414	ELECTRIC & HYBRID VEHICLES (EE713PE)	**C414.1**	Understand the performance of conventional vehicles by mathematical models.
		C414.2	Illustrate the importance of hybrid and electric vehicles to safeguard environment
		C414.3	Analyze power flow of hybrid electric drive trains by various topologies
		C414.4	Evaluate the energy storage technology by sizing various sub systems
		C414.5	Analyze Performance of DC and AC drives
		C414.6	Understand energy management strategies of hybrid and battery electric vehicles
C415	HVDC TRANSMISSION (EE721PE)	**C415.1**	Compare HVDC and AC Transmission systems in all aspects.
		C415.2	Analyze HVDC system with Gratez circuit.
		C415.3	Evaluate Converter control characteristics for different control schemes.
		C415.4	Discuss Reactive power control and Power Flow analysis in HVDC system.
		C415.5	Elucidate converter faults and their protection schemes.
		C415.6	Analyze AC and DC filters for different types of harmonics.
C416	POWER SYSTEM RELIABILITY (EE722PE)	**C416.1**	Understand the basic concepts of probability and reliability
		C416.2	Estimate loss of load and energy indices for generation systems model
		C416.3	Describe merging generation and load models
		C416.4	Apply various indices for distribution systems
		C416.5	Evaluate reliability of interconnected systems
		C416.6	Assesee reliability of Substations and Switching Stations
C417	INDUSTRIAL ELECTRICAL SYSTEMS (EE723PE)	**C417.1**	Understand the electrical wiring system components and single line diagram
		C417.2	Represent the electrical systems with standard symbols and drawings for residential and commercial consumers
		C417.3	Design a lighting scheme for residential and commercial premises
		C417.4	Understand various components of industrial electrical systems
		C417.5	Design industrial electrical system
		C417.6	Analyze and select the proper size of various electrical system components
C418	FUNDAMENTAL OF MANAGEMENT FOR ENGINEERS (SM701MS)	**C418.1**	Understand the concept of Management and its approaches.
		C418.2	Study the process of planning and development of business strategies for problem solving and decision making.
		C418.3	Understand the Principles of organization for better Human Resource Management
		C418.4	Develop leadership qualities and make familiarize with motivational theories in an organization.
		C418.5	Study the controlling techniques in an organization.
		C418.6	Study the control frequency and methods for effective control.
C419	ELECTRICAL AND	**C419.1**	Fabricate basic electrical circuit elements/networks

	ELECTRONICS DESIGN LAB (EE701PC)	**C419.2**	Excel in hardware to do soldering & winding works
		C419.3	Trouble shoot the electrical circuits
		C419.4	Identify the device to be suited for protection of appliances
C41A	INDUSTRY ORIENTED MINI PROJECT (EE702PC)	**C41A.1**	Acquire practical knowledge within the chosen area of technology for project development
		C41A.2	identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach
		C41A.3	contribute as an individual or in a team in development of technical projects
		C41A.4	Develop effective communication skills for presentation of project related activities
C41B	SEMINAR (EE703PC)	**C41B.1**	Identify emerging topic specific to the Programme.
		C41B.2	Extract the information relevant to the chosen topic.
		C41B.3	Deliver the knowledge using multimedia.
		C41B.4	Answer the queries with appropriate explanation and elaboration
		C41B.5	Compile an effective technical report, providing conclusions and proposing an appropriate future scope.
		C41B.6	Identify emerging topic specific to the Programme.
C41C	PROJECT STAGE - I (EE704PC)	**C41C.1**	Identify the problem, conduct literature survey and formalize it.
		C41C.2	Analyze the problem & propose cost-effective and eco-friendly solution using relevant tools
		C41C.3	Prepare the design plan with appropriate time lines.
		C41C.4	Demonstrate effective communication and report writing Skills.
		C41C.5	Recognise the need for team work and demonstrate professional ethics.
		C41C.6	Compute various parameters of EHV line for modeling (Simulation)

Course Outcomes for R22 Regulation II-Semester			
I Year II Sem			
C121	**ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (MA201BS)**	**C121.1**	Solve geometrical and physical problems using first order and first degree differential equation.
		C121.2	Solve higher order linear differential equations with constant coefficients
		C121.3	Evaluate double and triple integrals
		C121.4	Estimate area, volume, center of mass and gravity using multiple integration
		C121.5	Analyze the properties of Differential Operators
		C121.6	Evaluate the line, surface, and volume integrals using their inter-relationships
C122	**APPLIED PHYSICS (PH202BS)**	**C122.1**	Understand the basic electronic modifications that reflect on properties of materials for advance design of materials.
		C122.2	Analyze the basic properties of water and its usage in domestic and industrial purposes.
		C122.3	Inspect the working principles of electrochemical systems for the production of various energy storage devices.
		C122.4	Analyze engineering problems related corrosion, metal finishing and use of appropriate design criteria in achieving a practical solution.
		C122.5	Design the materials that impact the natural and technological environments with the knowledge of stereochemistry.
		C122.6	Evaluate the materials behavior at microscale by spectroscopy which determines the development of materials for many real-world applications.
C123	**ENGINEERING WORKSHOP (ME203ES)**	**C123.1**	Analyze DC electric circuits with basic electrical components.
		C123.2	Analyze single phase and three phase AC circuits.
		C123.3	Analyze different types of Transformers
		C123.4	Understand the working of different rotating machines
		C123.5	Assess the performance of different rotating machines
		C123.6	Classify the components of Low Voltage Electrical Installations.
C124	**ENGLISH FOR SKILL ENHANCEMENT (EN204HS)**	**C124.1**	Apply English language effectively in spoken and written forms
		C124.2	Analyze the given texts and respond appropriately
		C124.3	Apply various grammatical structures in personal and academic fronts.
		C124.4	Make use of appropriate vocabulary for professional communication
		C124.5	Apply English language competency in various forms of academic and professional writing.
		C124.6	Communicate effectively during presentations, interviews and collaborative projects.
C125	**ELECTRICAL CIRCUIT ANALYSIS – II (EE205ES)**	**C125.1**	Analyze transient response of electrical networks using classical approach.
		C125.2	Analyze the networks for standard input functions using Laplace

			transforms
		C125.3	Evaluate two-port network parameters and effect of their inter connections
		C125.4	Analyze the effect of inter connections two port networks
		C125.5	Analyze the design aspects of various types of filters
		C125.6	Formulate various types of network matrices using graph theory.
C126	**APPLIED PYTHON PROGRAMMING LABORATORY (EE206ES)**	**C126.1**	Build basic programs using fundamental programming constructs.
		C126.2	Develop reusable code using standard library functions
		C126.3	Use different packages for processing data from files and plotting graphs.
		C126.4	Implement applications on hardware boards using Python.
C127	**APPLIED PHYSICS LABORATORY (PH207BS)**	**C127.1**	Estimate the work function of metal using Photoelectric effect and identify the type of semiconductor material whether it is n-type or p-type by Hall effect.
		C127.2	Determine energy gap and resistivity of semiconductors and draw the characteristics of semiconductor and optoelectronic devices.
		C127.3	Understand the electrical and magnetic properties of materials.
		C127.4	Demonstrate the working principle of lasers and optical fibers.
C128	**ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY (EN208HS)**	**C128.1**	Understand nuances of English language through audio-visual experience
		C128.2	Write professional documents such as letters, reports and projects.
		C128.3	Use neutralized accent for intelligibility
		C128.4	Demonstrate production skills during interviews, presentations, collaborative projects.
C129	**ELECTRICAL CIRCUIT ANALYSIS LABORATORY (EE209ES)**	**C129.1**	Analyze the time response of R-L-C circuits with DC and AC sources
		C129.2	Study the resonance phenomena and filter circuits characteristics
		C129.3	Determine the active and reactive power of a three phase electrical networks.
		C129.4	Calculate two port network parameters for a given electrical network.
C12A	**ENVIRONMENTAL SCIENCE (MC210)**	**C12A.1**	Discover knowledge regarding environment and its components.
		C12A.2	Understand the classification, importance and conservation of natural resources.
		C12A.3	Perceive the knowledge regarding different Bio -Geo classification of India.
		C12A.4	Examine impacts of pollution on the environment and their control measures.
Course Outcomes for R18 Regulation I-Semester			
II Year II Sem			
C221	**LAPLACE TRANSFORMS, NUMERICAL METHODS & COMPLEX VARIABLES (MA401BS)**	**C221.1**	Apply Laplace Transforms to solve ordinary differential equations
		C221.2	Estimate unknown values for a given data using Interpolation and method of least squares.
		C221.3	Apply numerical methods to solve algebraic and transcendental equations.
		C221.4	Apply numerical methods to evaluate definite integrals and solve initial value problems.

		C221.5	Analyze the complex functions with reference to their analyticity
		C221.6	Apply the knowledge of complex functions to evaluate various integrals.
C222	**ELECTRICAL MACHINES-II (EE402PC)**	**C222.1**	Illustrate the construction and working principle of Induction & Synchronous Machines
		C222.2	Assess the performance and speed control of a poly phase induction motor.
		C222.3	Illustrate different starting methods of Induction & Synchronous motors.
		C222.4	Evaluate the voltage regulation of Alternators using different methods
		C222.5	Evaluate the performance of synchronous generators for parallel operation and load sharing.
		C222.6	Assess the single phase motors for different applications
C223	**DIGITAL ELECTRONICS (EE403PC)**	**C223.1**	Apply the concepts of number systems, codes and Boolean algebra to simplify logic expressions
		C223.2	Understand working of logic families and logic gates.
		C223.3	Design combinational logic circuits and apply minimization techniques for optimizing combinational logic.
		C223.4	Design a sequential logic circuit and analyze its timing properties.
		C223.5	Differentiate between various data converters.
		C223.6	Understand memory organization and Implement the given logical problem using PLDs
C224	**CONTROL SYSTEMS (EE404PC)**	**C224.1**	Evaluate the types of control systems for real time applications.
		C224.2	Compute transfer function of a system by different techniques.
		C224.3	Evaluate the time response of systems for standard input signals.
		C224.4	Probe the stability of a system using time and frequency domain approach
		C224.5	Examine the performance of systems with compensators and controllers
		C224.6	Construct state models for continuous time systems and Comment on controllability and observability of the system
C225	**POWER SYSTEMS-I (EE405PC)**	**C225.1**	Categorize the sources of power generation with merits and demerits.
		C225.2	Outline the economic aspects for electrical power generation and loads.
		C225.3	Evaluate the insulators of over head lines based on performance.
		C225.4	Compute transmission line parameters for different configurations.
		C225.5	Compute cost of electric power generation using various tariff structures
		C225.6	Compute voltage drop in distribution systems based on various requirements & design features.
C226	**DIGITAL ELECTRONICS LAB (EE306PC)**	**C226.1**	Implement Boolean Expressions using universal logic gates.
		C226.2	Design and verify Combinational logic circuits using various logic gates.
		C226.3	Design and verify Sequential logic circuits using flip flops.
		C226.4	Realization of logic gates using different logic families.

C227	**ELECTRICAL MACHINES LAB-II (EE407PC)**	**C227.1**	Analyze the performance of a single phase transformer.
		C227.2	Analyze the scott connection and Load sharing of transformers.
		C227.3	Examine the performance of Induction motor at different loading conditions.
		C227.4	Appraise the performance of synchronous machines by using different methods.
C228	**CONTROL SYSTEMS LAB (EE408PC)**	**C228.1**	Design the state space model of a linear system using simulation.
		C228.2	Analyze the response of systems in frequency & time domain.
		C228.3	Calculate the transfer function and observe the effect of feedback on the systems
		C228.4	Examine the effect of controllers & Compensators on the system.
C229	**CONSTITUTION OF INDIA (MC409)**	**C229.1**	Examine salient features of Indian Constitution and live accordingly in society
		C229.2	Interpret the meaning of Fundamental Rights and Directive Principles of State Policy and, develop an attitude which paves the way for better living conditions.
		C229.3	Discover various aspects of Union Government legislation and live up to the expectations of the rules.
		C229.4	Critically examine State Government legislation and improve your living standards by following the rules strictly
		C229.5	Examine powers and functions of local bodies such as Municipalities and Panchayats and, take advantage of available resources for better living
		C229.6	Analyze the powers and functions of Election Commission and The Union Public Service Commission and decide upon it for safe and secured life.
III Year II Sem			
C321	**RELLIABILITY ENGINEERING (EE600OE)**	**C321.1**	Analyze reliability of various systems
		C321.2	Model various systems applying reliability networks
		C321.3	Evaluate the reliability of simple and complex systems
		C321.4	Estimate the limiting state probabilities of repairable systems
		C321.5	Apply various mathematical models for evaluating reliability of irreparable systems
		C321.6	Interpret frequency and duration techniques for evaluation of systems
C322	**RENEWABLE ENERGY SOURCES (EE601OE)**	**C322.1**	Assess the energy economics for conventional and renewable energy sources
		C322.2	Understand the principles of wind and solar photovoltaic power generation , fuel cells
		C322.3	Illustrate working principle and characteristics of Induction Generator
		C322.4	Analyze various energy storage systems
		C322.5	Understand the integration and interconnection of alternative energy sources with the grid
		C322.6	Analyze the issues involved in the integration of non-renewable energy sources to the grid
C323	**OPTIMIZATION TECHNIQUES**	**C323.1**	Optimize given engineering problem by using suitable techniques

	(EE611PE)	**C323.2**	Formulate and solve linear programming problem
		C323.3	Obtain optimal solutions of transportation Problem
		C323.4	Optimize Un Constrained non - linear programming problems
		C323.5	Optimize Constrained non - linear programming problems
		C323.6	Solve the dynamic Programming problems
C324	**POWER SEMICONDUCTOR DRIVES (EE612PE)**	**C324.1**	Analyze the performance of DC drive fed by controlled rectifiers.
		C324.2	Assess different braking modes of DC drives for specific control requirements
		C324.3	Elucidate closed loop control of converter fed DC drives
		C324.4	Assess the static and dynamic performance characteristics of AC drives
		C324.5	Examine performance of AC drives fed by variable voltage and frequency supplies
		C324.6	Illustrate various power electronic converters to control the speed of synchronous motor
C325	**WIND AND SOLAR ENERGY SYSTEMS (EE613PE)**	**C325.1**	Distinguish between the sustainable energy sources and fossil energy sources with emphasis on Wind and Solar power generation systems
		C325.2	Understand the basic physics of Wind and Solar power generation
		C325.3	Analyze the Wind generator topology
		C325.4	Differentiate the types of PV Panels and their characteristics
		C325.5	Compute solar power generation by various technologies
		C325.6	Analyze the power quality issues related to the grid integration of Solar and Wind energy systems
C326	**SIGNALS AND SYSTEMS (EE601PC)**	**C326.1**	Apply the principle of orthogonality in signal analysis
		C326.2	Analyze the Spectral characteristics of Periodic and aperiodic continuous signals
		C326.3	Explore the signal transmission through linear systems
		C326.4	Employ Laplace and Z transforms in system analysis
		C326.5	Describe the significance of sampling theorem
		C326.6	Apply the concepts of convolution and correlation in signal and system analysis
C327	**MICROPROCESSORS & MICROCONTROLLERS (EE602PC)**	**C327.1**	Differentiate architectural features and modes of operation of 8086 microprocessor and 8051 microcontroller.
		C327.2	Summarize the addressing modes, instruction set and assembler directives of 8086 Microprocessor and 8051 Micro controller.
		C327.3	Write assembly language programs for 8086 Microprocessor and 8051 Microcontroller.
		C327.4	Interface various peripheral devices and memory with 8051 microcontroller.
		C327.5	Analyze the architectural features and instruction set of ARM processor
		C327.6	Explain the architectural feature of CORTEX and OMAP processors
C328	**POWER SYSTEM PROTECTION (EE603PC)**	**C328.1**	Distinguish the relays based on their operating principle along with their usage.
		C328.2	Differentiate various over current and Distance protection schemes.
		C328.3	Probe the protection schemes for generation and transmission systems during faults.

		C328.4	Understand the basics of static and microprocessor based relays.
		C328.5	Evaluate the construction and working of circuit breakers for real time applications.
		C328.6	Discriminate the types of fuses and their characteristics
C329	**POWER SYSTEM OPERATION AND CONTROL (EE604PC)**	**C329.1**	Evaluate load flow parameters using Numerical Methods.
		C329.2	Compute parameters for economical operation of power systems
		C329.3	Model the blocks for speed governor, turbine, Synchronous generator and Excitation system using mathematical Approach
		C329.4	Analyze the steady state performance of Frequency and Voltage for single and two area systems
		C329.5	Analyze dynamic, transient and steady state behavior of power system networks.
		C329.6	Understand the features of SCADA and EMS of power systems
C32A	**POWER SYSTEMS LAB (EE605PC)**	**C32A.1**	Evaluate load flow parameters using Numerical Methods.
		C32A.2	Analyze the performance of Transmission lines and Relays
		C32A.3	Analyze the stability and the sequence impedances of AC Machines.
		C32A.4	Asses the parameters and impact of faults on a power system network.
C32B	**MICROPROCESSORS LAB (EE606PC)**	**C32B.1**	Debug 8086 assembly language programs using macro assembler.
		C32B.2	Write 8051 assembly language programs for simple arithmetic and logical operations and verify using Keil IDE.
		C32B.3	Write 8051 assembly language programs to configure various peripheral devices and verify using Keil IDE.
		C32B.4	Interface various input/output devices to 8051 microcontroller using development kit.
C32C	**SIGNALS AND SYSTEMS LAB (EE607PC)**	**C32C.1**	Analyze signals and systems in time and complex frequency domain using MATLAB
		C32C.2	Perform convolution operation between various signals using MATLAB
		C32C.3	Write MATLAB programs to find the Fourier series coefficients of periodic signals and plot the complex Fourier spectrum
		C32C.4	Verify Sampling Theorem in MATLAB
C32D	**ENVIRONMENTAL SCIENCE (*MC609)**	**C32D.1**	Discover knowledge regarding environment and its components.
		C32D.2	Understand the classification, importance and conservation of natural resources.
		C32D.3	Perceive the knowledge regarding different Bio -Geo classification of India.
		C32D.4	Examine impacts of pollution on the environment and their control measures.
		C32D.5	Analyze Environmental laws and Environmental Impact Assessments.
		C32D.6	Determine sustainable development that aims to meet raising human needs.
IV Year II Sem			
C421	**POWER QUALITY & FACTS (EE811PE)**	**C421.1**	Elucidate the power quality issues and the related terms
		C421.2	Know the significance of shunt compensation and role of FACTS devices on system control

		C421.3	Know the significance of series compensation and role of FACTS devices on system control.
		C421.4	Understand the difference between SVC and STATCOM
		C421.5	Analyze the various topologies and control schemes of series compensators
		C421.6	Analyze the functional operation and control schemes of series-shunt compensator
C422	**CONTROL SYSTEMS DESIGN (EE812PE)**	**C422.1**	Understand various design specifications.
		C422.2	Design compensators to satisfy the desired design specifications in time domain
		C422.3	Design compensators to satisfy the desired design specifications in frequency domain
		C422.4	Design the PID controllers in time & frequency domains
		C422.5	Design controllers using the state-space approach.
		C422.6	Understand the various types of non-linearities and its effects on system performance
C423	**AI TECHNIQUES IN ELECTRICAL ENGINEERING (EE813PE)**	**C423.1**	Interpret biological neuron to a mathematical model ,learning rules and ANN Architectures
		C423.2	Elucidate multi-layer perceptron models , Associate memory and Hopfield networks
		C423.3	Appraise fuzzy logic theory with respect to Classical set theory
		C423.4	Analyze genetic algorithm, operations and genetic mutations
		C423.5	Elucidate ANN models, fuzzy logic control for applications in electrical engineering
		C423.6	Elucidate genetic algorithm for applications in electrical engineering
C424	**SMART GRID TECHNOLOGIES (EE821PE)**	**C424.1**	Understand the various aspects of the smart grid
		C424.2	Analyze smart grid with the computational tools and techniques
		C424.3	Interpret distribution technologies with the smart grid
		C424.4	Understand the operation and maintenance of Communication technologies to the smart grid
		C424.5	Classify the control techniques used in smart grids
		C424.6	Understand the various aspects of the smart grid
C425	**ELECTRICAL DISTRIBUTION SYSTEMS (EE822PE)**	**C425.1**	Assess characteristics and various factors for different types of loads
		C425.2	Classify distribution feeders based on design considerations
		C425.3	Compute the rating of substation under specified constraints related to distribution systems
		C425.4	Categorize various protective devices and their coordination
		C425.5	Estimate the line drop and power factor in distribution systems
		C425.6	Assess the type of capacitor and suitable location for voltage control and it's regulation
C426	**ADVANCED CONTROL OF ELECTRIC DRIVES (EE823PE)**	**C426.1**	Analyze different control strategies of power converters for drives control.
		C426.2	Understand the modeling of AC drives.
		C426.3	Understand the advanced control techniques for AC drives.
		C426.4	Analyze the performance of various PM motor drives.
		C426.5	Understand various control strategies of SRM Drives.

		C426.6	Analyze DSP based motion controllers.
C427	**PROJECT STAGE - II (EE801PC)**	**C427.1**	Implement the project plan complying with deadlines
		C427.2	Validate the design to meet the specifications
		C427.3	Evaluate the results to derive the conclusion and provide scope for future enhancement.
		C427.4	Integrate Information from multiple sources and write a comprehensive report
		C427.5	Demonstrate technical, interpersonal and leadership skills in a team
C428	**BASICS OF POWER PLANT ENGINEERING (EE800OE)**	**C428.1**	Understand the components and layouts of various power plants.
		C428.2	Analyze Rankine Cycle in coal based power plants and Brayton Cycle in Gas turbine power plants
		C428.3	Elucidate various nuclear reactors
		C428.4	Discuss the principles of various non-conventional energy power plants
		C428.5	Examine the economic aspects for electrical power generation
		C428.6	Apply various pollution control techniques in power plants.
C429	**ENERGY SOURCES AND APPLICATIONS (EE801OE)**	**C429.1**	Elucidate the main sources of energy and their primary applications nationally and internationally.
		C429.2	Know the various energy sources and scientific concepts, principles with effect to environment and climate.
		C429.3	Describe the challenges with the use of energy sources and the impact on the environment.
		C429.4	List and describe the primary renewable energy resources and technologies.
		C429.5	Quantify energy demands and make comparisons among energy uses, resources and technologies.
		C429.6	Collect and organize information on renewable energy technologies as a basis for further analysis and evaluation.

BVRIT HYDERABAD

College of Engineering for Women

Rajiv Gandhi Nagar, Bachupally, Hyderabad -90

Department of Electronics and Communication Engineering

Course Outcomes for R22 Regulation I-Semester			
I Year I Sem			
Course Code	**Course Name**	**CO. No.**	**Course Outcomes**
C111	**MATRICES AND CALCULUS (MA101BS)**	**C111.1**	Solve the system of linear equations using various methods
		C111.2	Analyze the nature of quadratic form using eigen values and eigen vectors
		C111.3	Test the convergence or divergence of a given series
		C111.4	Derive infinite series expansions from mean value theorems
		C111.5	Evaluate multiple and improper integrals with some application
		C111.6	Optimize a given function with respect to given contrains
C112	**APPLIED PHYSICS (PH102BS)**	**C112.1**	Understand physical world from fundamental point of view by the concepts of Quantum mechanics and classify the solids
		C112.2	Identify the role of semiconductor devices in science and engineering Applications.
		C112.3	Explore the fundamental properties of dielectric, magnetic and energy materials for their applications
		C112.4	Appreciate the features and applications of Nanomaterials
		C112.5	Understand various aspects of Lasers and their applications in diverse fields
		C112.6	Explain principle of optical fibers and their significance in communication
C113	**C PROGRAMMING FOR ENGINEERS (EC103ES)**	**C113.1**	Identify various components of Computer and understand the basics of algorithms and flowcharts.
		C113.2	Implement control structures using C programming language
		C113.3	Develop reusable code using the concept of modular programming.
		C113.4	Use arrays and various string handling functions to solve problems.
		C113.5	Explore pointers and file handling functions using C
		C113.6	Apply the knowledge of user defined data types and demonstrate various searching and sorting techniques along with their time complexities
C114	**ENGINEERING WORKSHOP (ME104ES)**	**C114.1**	Distinguish carpentry, fitting, black smithy and welding manufacturing processes.
		C114.2	Develop house hold and engineering goods from metallic sheets in tin smithy.
		C114.3	Apply basic electrical engineering knowledge for house wiring practice.
		C114.4	Construct a sand mould for a given pattern using foundry tools.
C115	**ENGLISH FOR SKILL ENHANCEMENT**	**C115.1**	Apply English language effectively in spoken and written forms
		C115.2	Analyze the given texts and respond appropriately

	(EN105HS)	**C115.3**	Apply various grammatical structures in personal and academic fronts.
		C115.4	Make use of appropriate vocabulary for professional communication
		C115.5	Apply English language competency in various forms of academic and professional writing.
		C115.6	Communicate effectively during presentations, interviews and collaborative projects.
C116	**ELEMENTS OF ELECTRONICS AND COMMUNICATION ENGINEERING (EN105HS)**	**C116.1**	Identify the different components and ICs used for electronic applications
		C116.2	Measure different parameters using various measuring devices
		C116.3	Distinguish various signal used for analog and digital communications
		C116.4	Describe the significance of Electronics and communication subjects and various Software tools
C117	**APPLIED PHYSICS LABORATORY (PH107BS)**	**C117.1**	Estimate the work function of metal using Photoelectric effect and identify the type of semiconductor material whether it is n-type or p-type by Hall effect.
		C117.2	Determine energy gap and resistivity of semiconductors and draw the characteristics of semiconductor and optoelectronic devices.
		C117.3	Understand the electrical and magnetic properties of materials
		C117.4	Demonstrate the working principle of lasers and optical fibers.
C118	**C PROGRAMMING FOR ENGINEERS LABORATORY (EC103ES)**	**C118.1**	Build programs using control structures to solve simple mathematical problems..
		C118.2	Use functions to develop modular reusable code.
		C118.3	Apply derived data types and file handling functions to solve problems.
		C118.4	Implement searching and sorting algorithms
C119	**ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY (EC108ES)**	**C119.1**	Understand nuances of English language through audio-visual experience
		C119.2	Write professional documents such as letters, reports and projects.
		C119.3	Use neutralized accent for intelligibility
		C119.4	Demonstrate production skills during interviews,presentations, collaborative projects.
C11A	**Environmental Science (EN109HS)**	**C11A.1**	Discover knowledge regarding environment and its components.
		C11A.2	Understand the classification, importance and conservation of natural resources.
		C11A.3	Perceive the knowledge regarding different Bio -Geo classification of India.
		C11A.4	Examine impacts of pollution on the environment and their control measures.
Course Outcomes for R18 Regulation I-Semester			
II Year I Sem			
Course Code	**COURSE NAME**	**CO. No.**	**Course Outcomes**
C211	ELECTRONIC DEVICES AND CIRCUITS (EC301PC)	**C211.1**	Analyze the construction, principle of operation and characteristics of PN junction diode.
		C211.2	Differentiate various types of diodes and their applications.

		C211.3	Design biasing circuits to maintain a stable operating point based on given specifications.
		C211.4	Choose appropriate BJT configuration for a given application.
		C211.5	Evaluate the characteristics of BJT and FET devices.
		C211.6	Analyze the amplifier configurations of BJT and FET devices using h parameters.
C212	NETWORK ANALYSIS AND TRANSMISSION LINES (EC302PC)	**C212.1**	Analyze the network topologies with electrical components
		C212.2	Analyze the steady state and transient response of RLC circuits
		C212.3	Illustrate the characteristics of two port network parameters
		C212.4	Design attenuators and impedance matching networks
		C212.5	Evaluate various transmission line parameters
		C212.6	Analyze Transmission line using Smith Chart with impedance considerations
C213	DIGITAL SYSTEM DESIGN (EC303PC)	**C213.1**	Apply the concepts of number systems, codes and Boolean algebra to simplify logic expressions.
		C213.2	Design simple combinational logic circuits.
		C213.3	Apply minimization techniques for optimizing combinational logic.
		C213.4	Design and analyze simple sequential circuits
		C213.5	Apply minimization techniques for sequential circuits
		C213.6	Realize logic gates using diodes and transistors
C214	SIGNALS AND SYSTEMS (EC304PC)	**C214.1**	Analyze the orthogonality of signals
		C214.2	Analyze the Spectral characteristics of Periodic and aperiodic continuous signals
		C214.3	Apply sampling theorem in analog to digital signal conversion.
		C214.4	Analyze the signal transmission through linear time invariant systems.
		C214.5	Apply the concepts of convolution and correlation in signal and system analysis
		C214.6	Analyze continuous and discrete-time signals and systems using Laplace and Z Transforms respectively
C215	PROBABILITY THEORY AND STOCHASTIC PROCESSES (EC305ES)	**C215.1**	Apply the concepts of probability theory to solve probabilistic problems.
		C215.2	Analyze various distribution and density functions of a random variable.
		C215.3	Estimate various parameters of a random variable multiple random variables
		C215.4	Analyze the temporal and spectral characteristics of stochastic processes.
		C215.5	Analyze the characteristics and modelling of various noise sources
		C215.6	Analyze various Source coding techniques and related laws
C216	ELECTRONIC DEVICES AND CIRCUITS LAB (EC306PC)	**C216.1**	Analyze the characteristics of different practical diodes.
		C216.2	Construct electronic circuits for various applications using diodes.
		C216.3	Analyze the characteristics of different Transistor configurations.
		C216.4	Design amplifier circuits for a given specification.
C217	DIGITAL SYSTEM	**C217.1**	Implement Boolean Expressions using universal logic gates

	DESIGN LAB (EC307PC)	**C217.2**	Design and verify Combinational logic circuits using IC's
		C217.3	Design and verify Sequential logic circuits using IC's
		C217.4	Implement Counters & Shift registers using FF's
C218	BASIC SIMULATION LAB (EC308EC)	**C218.1**	Perform various operations on signals
		C218.2	Verify the properties of LTI system and its response for different inputs.
		C218.3	Analyze the signals using various transforms
		C218.4	Analyze the characteristics of signals in noisy environment.
			III Year I Sem
C311	MICROPROCESSORS &MICROCONTROLLERS (EC501PC)	**C311.1**	Differentiate architectural features and modes of operation of 8086 microprocessor and 8051 microcontrollers.
		C311.2	Summarize the addressing modes, instruction set and assembler directives of 8086 Microprocessor and 8051 Microcontroller.
		C311.3	Write assembly language programs for 8086 Microprocessor and 8051 Microcontroller.
		C311.4	Interface various peripheral devices and memory with 8051 microcontrollers.
		C311.5	Analyze the architectural features and instruction set of ARM processor
		C311.6	Explain the architectural feature of CORTEX and OMAP processors
C312	DATA COMMUNICATIONS AND NETWORKS (EC502PC)	**C312.1**	Analyze the Categories and functions of various Data communication Networks
		C312.2	Design and analyze various error detection techniques.
		C312.3	Demonstrate the mechanism of routing the data in network layer
		C312.4	Analyze the significance of various Flow control and Congestion control Mechanisms
		C312.5	Analyze the Functioning of various Application layer Protocols.
		C312.6	Analyze the features and operations of various user interface protocols.
C313	CONTROL SYSTEMS (EC503PC)	**C313.1**	Evaluate the types of control systems for real time applications.
		C313.2	Compute transfer function of a system by different techniques.
		C313.3	Evaluate the time response of systems for standard input signals.
		C313.4	Probe the stability of a system using time and frequency domain approach
		C313.5	Examine the performance of systems with compensators and controllers
		C313.6	Construct state models for continuous & discrete time systems and Comment on controllabity and observability of the system
C314	BUSINESS ECONOMICS & FINANCIAL ANALYSIS (SM504MS)	**C314.1**	Understand the Economic Concepts in business decision making process.
		C314.2	Familiarize with the cost concepts, market structures.
		C314.3	Make use of breakeven analysis, CVP Analysis, pricing strategies.
		C314.4	Examine financial accounting and analyze various financial

			statements.
		C314.5	Interpret various financial statements by applying different types of ratios.
		C314.6	Examine the usefulness of funds flow statement and cash flow statement for better managerial decisions.
C315	COMPUTER ORGANIZATION & OPERATING SYSTEMS (EC511PE)	**C315.1**	Examine the Basic structure of a digital computer and the organization of different blocks in a computer using Micro Operations
		C315.2	Use of micro-level operations to control different Units in a computer and analyze the concept of Memory system.
		C315.3	Examine the organization of the I/O peripheral devices.
		C315.4	Analyze the Operating system functions, types, system calls.
		C315.5	Demonstrate the memory management techniques impact on architecture of computer design and Principals of Deadlock.
		C315.6	Examine file system implementation and its interface.
C316	ERROR CORRECTING CODES (EC512PE)	**C316.1**	Calculate various information parameters and explain the types of errors and control strategies
		C316.2	Explain error detection and correction mechanism of linear block codes and its applications
		C316.3	Design cyclic codes for error detection
		C316.4	Implement encoding and decoding techniques of Convolution codes
		C316.5	Elucidate encoding and decoding process of Turbo codes and its applications
		C316.6	Describe the concepts of space time codes
C317	ELECTRONIC MEASUREMENTS AND INSTRUMENTATION (EC513PE)	**C317.1**	Illustrate the characteristics and operating principles of measuring systems.
		C317.2	Summarize the construction and operation of various Wave Analyzers and Signal generators.
		C317.3	Analyze the working principles and applications of different types of Oscilloscopes
		C317.4	Measure R, L and C values using different bridge circuits.
		C317.5	Utilise transducers to compute various electrical parameters.
		C317.6	Make use of measuring devices to measure different physical parameters
C318	MICROPROCESSORS & MICROCONTROLLERS LAB (EC505PC)	**C318.1**	Debug 8086 assembly language programs using macro assembler.
		C318.2	Write 8051 assembly language programs for simple arithmetic and logical operations and verify using Keil IDE.
		C318.3	Write 8051 assembly language programs to configure various peripheral devices and verify using Keil IDE.
		C318.4	Interface various input/output devices to 8051 microcontroller using development kit.
C319	DATA COMMUNICATIONS AND NETWORKS LAB (EC506PC)	**C319.1**	Create and evaluate the performance of various LAN topologies
		C319.2	Evaluate the performance of queue management, scheduling mechanisms and protocols
		C319.3	Evaluate the performance of routing protocols and IEEE 802.x standards.

		C319.4	Analyze various protocols using packet capture monitoring tools.
C31A	ADVANCED COMMUNICATION SKILLS LAB (EN508HS)	**C31A.1**	Build sound vocabulary and use functional English effectively.
		C31A.2	Analyze the given text and respond appropriately and develop efficacious writing skills
		C31A.3	Develop effective speaking skills and maximize job prospects
		C31A.4	Plan and make different forms of presentation using various techniques
C31B	INTELLECTUAL PROPERTY RIGHTS (MC510)	**C31B.1**	Discuss the fundamental aspects of Intellectual property Rights which play a major role in development and management of innovative projects in industries.
		C31B.2	Examine Trademarks, Acquisition of Trade Mark Rights and its registration processes.
		C31B.3	Evaluate various aspects relating to copyrights and its procedure for registration processes.
		C31B.4	Evaluate with the Trade Secret Law, protection for submission, Unfair Competition
		C31D.2	Evaluate on the International Developments in Intellectual Property Rights
IV YEAR I SEM			
C411	MICROWAVE AND OPTICAL COMMUNICATIONS (EC701PC)	**C411.1**	Analyze the characteristics of O-type and M-type microwave tubes
		C411.2	Illustrate the operation of various solid state devices
		C411.3	Examine various waveguide components and their applications.
		C411.4	Estimate S-parameters of multiport junction devices
		C411.5	Measure various parameters using microwave bench
		C411.6	Understand an optical fiber communication system
C412	ARTIFICIAL NEURAL NETWORKS (EC711PE)	**C412.1**	Infer the similarity of Biological networks and Neural networks
		C412.2	understand the architecture and learning algorithms
		C412.3	Perform the training of neural networks using various learning rules.
		C412.4	Analyze the concepts of backward propagations.
		C412.5	Applying SOM for computer simulation.
		C412.6	Analyze and construct the Hopfield models.
C413	SCRIPTING LANGUAGES (EC712PE)	**C413.1**	Make use of resources to gain some fluency programming in Linux, Perl, TCL/TK, Python
		C413.2	Elaborate about Known about basics of Linux and Linux Networking.
		C413.3	Understanding the Perl by utilizing the features
		C413.4	Explain various features of TCL Scripting
		C413.5	Examine the TK by embedding in different ways
		C413.6	Elaborate features of Python
C414	DIGITAL IMAGE PROCESSING (EC713PE)	**C414.1**	Explain the fundamentals of digital image processing
		C414.2	Analyze the digital image using different image transforms
		C414.3	Apply spatial and frequency domain filtering techniques for image enhancement
		C414.4	Estimate the original image from a noisy one using different approaches in image restoration

		C414.5	Examine different types of discontinuities using image segmentation algorithms
		C414.6	Apply Morphological operations and compression techniques on different images
C415	BIOMEDICAL INSTRUMENTATION (EC721PE)	**C415.1**	Characterize bio potential signals.
		C415.2	Analyse the biomedical signal sources and related equipment
		C415.3	Illustrate cardiovascular system and its measurements.
		C415.4	Distinguish Neurological measuring Instruments.
		C415.5	Evaluate different Therapeutic equipment and Respiratory Instrumentation systems
		C415.6	Describe the different medical principles for medical imaging.
C416	DATABASE MANAGEMENT SYSTEMS (EC722PE)	**C416.1**	Demonstrate the basic elements of a database management system and the conceptual design of databases with the help of Entity-Relationship model.
		C416.2	Construct Relational Model by converting Entity-Relationship Model
		C416.3	Apply SQL queries for database management
		C416.4	Apply normalization on schema to reduce data redundancy and increase data consistency.
		C416.5	Test transaction, concurrency control models and recovery mechanisms on database.
		C416.6	Classify different storage devices and indexing methods.
C417	NETWORK SECURITY AND CRYPTOGRAPHY (EC723PE)	**C417.1**	Illustrate the concepts and principles of security Attacks, Services and Mechanisms.
		C417.2	Evaluate applications of Cryptographic algorithms in real time scenarios.
		C417.3	Apply various public key cryptography techniques
		C417.4	Demonstrate the techniques like Message authentication, Hash function and Authentication applications.
		C417.5	Assess different key management techniques and solutions for web security.
		C417.6	Analyze various case studies to identify the security vulnerabilities and prevention techniques.
C418	DATA STRUCTURES	**C418.1**	Implement various operations on linear data structures to solve real world problems.
		C418.2	Design solutions using Dictionaries and Hash Tables.
		C418.3	Implement various kinds of trees and their operations.
		C418.4	Represent graphs and traverse them.
		C418.5	Choose appropriate sorting algorithm.
		C418.6	Examine Pattern matching algorithms and Tries.
C419	PROFESSIONAL PRACTICE LAW AND ETHICS (SM701MS)	**C419.1**	Understand the Professional Practice and Ethics needed for Engineering Professionals.
		C419.2	Familiarize the various concepts in Law of Contract.
		C419.3	Analyse the challenges of Law and its judicial interventions.
		C419.4	Develop essential Strategies for protection of Labour and Labour related Laws.

		C419.5	Evaluate the Law relating to different types of Intellectual Property.
		C419.6	Apply the various issues relating to the professional practice, law and ethics aimed for overall development for a citizen, society.
C41A	MICROWAVE AND OPTICAL COMMUNICATION LAB (EC703PC)	**C41A.1**	Analyze the characterizes of microwave sources
		C41A.2	Measure the parameters of the various microwave components
		C41A.3	Analyze the characterizes of optical sources
		C41A.4	Measure the various parameters of the optical communication system
C41B	SEMINAR (EC705PC)	**C41B.1**	Identify emerging topic specific to the programme.
		C41B.2	Extract the information relevant to the chosen topic.
		C41B.3	Deliver the knowledge using multimedia.
		C41B.4	Answer the queries with appropriate explanation and elaboration.
		C41B.5	Compile an effective technical report, providing conclusions and proposing an appropriate future scope.
C41C	PROJECT STAGE - I (EC706PC)	**C41C.1**	Identify the problem, conduct literature survey and formalize it.
		C41C.2	Analyze the problem & propose cost-effective and eco-friendly solution using relevant tools
		C41C.3	Prepare the design plan with appropriate time lines.
		C41C.4	Demonstrate effective communication and report writing Skills.
		C41C.5	Recognize the need for team work and demonstrate professional ethics.

Course Outcomes for R22 Regulation II-Semester			
I Year II Sem			
C121	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (MA201BS)	**C121.1**	Solve geometrical and physical problems using first order and first degree differential equation.
		C121.2	Solve higher order linear differential equations with constant coefficients
		C121.3	Evaluate double and triple integrals
		C121.4	Estimate area, volume, center of mass and gravity using multiple integration
		C121.5	Analyze the properties of Differential Operators
		C121.6	Evaluate the line, surface, and volume integrals using their inter-relationships
C122	ENGINEERING CHEMISTRY (CH202BS)	**C122.1**	Analyze the basic properties of water and its usage in domestic and industrial purposes.
		C122.2	Inspect the working principles and reaction mechanisms of various energy storage devices
		C122.3	Acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
		C122.4	Impart the fundamental knowledge and sustainability implemented through smart engineering materials.
		C122.5	Distinguish various energy sources to prioritise eco friendly fuels for environmental sustainable development.
		C122.6	Discriminate the limitations of conventional basic engineering materials for developing multiphase materials.
C123	COMPUTER AIDED ENGINEERING GRAPHICS (ME203ES)	**C123.1**	Construct different types of non circular curves and scales used in various engineering applications.
		C123.2	Analyze the projections of points and lines.
		C123.3	Analyze the projections of planes and solids.
		C123.4	Apply different types of sectional planes to get the interior features of the objects by means of sectional views
		C123.5	Develop the surfaces to fabricate the objects.
		C123.6	Identify orthographic, Isometric projections and various CAD commands.
C124	BASIC ELECTRICAL ENGINEERING (EE204ES)	**C124.1**	Analyze DC electric circuits with basic electrical components.
		C124.2	Analyze single phase and three phase AC circuits.
		C124.3	Illustrate the performance of transformers.
		C124.4	Explain the construction of DC and AC machines
		C124.5	Explain the working Principle of DC and AC machine
		C124.6	Differentiate various components in electrical installations
C125	ELECTRONIC DEVICES AND CIRCUITS (EC205ES)	**C125.1**	Analyze the characteristics of PN junction diode.
		C125.2	Construct diode circuits for various applications.
		C125.3	Illustrate the transistor working in different configurations.
		C125.4	Differentiate between FET and BJT devices.
		C125.5	Illustrate the operation and characteristics of special purpose diodes.

		C125.6	Use diode and transistor as switches in electronic circuits.
C126	APPLIED PYTHON PROGRAMMING LABORATORY (EC206ES)	**C126.1**	Build basic programs using fundamental programming constructs.
		C126.2	Develop reusable code using standard library functions
		C126.3	Use different packages for processing data from files and plotting graphs.
		C126.4	Implement applications on hardware boards using Python.
C127	ENGINEERING CHEMISTRY LABORATORY (CH207BS)	**C127.1**	Analysis of materials using small quantities of materials involved for quick and accurate results
		C127.2	Interpret a new application by the analysis of physical principle involved in various instruments.
		C127.3	Develop experimental skills in building technological advances by qualitative and quantitative analysis of materials.
		C127.4	Learn and apply basic techniques used in chemistry laboratory for preparation, purification and identification.
C128	BASIC ELECTRICAL ENGINEERING LABORATORY (EE208ES)	**C128.1**	Analysis of materials using small quantities of materials involved for quick and accurate results
		C128.2	Interpret a new application by the analysis of physical principle involved in various instruments.
		C128.3	Develop experimental skills in building technological advances by qualitative and quantitative analysis of materials.
		C128.4	Learn and apply basic techniques used in chemistry laboratory for preparation, purification and identification.
C129	ELECTRONIC DEVICES AND CIRCUITS LABORATORY (EC209ES)	**C129.1**	Analyze the characteristics of PN junction diode and its applications.
		C129.2	Verify the characteristics of various configurations of BJT and FET devices.
		C129.3	Analyze the switching characteristics of a transistor.
		C129.4	Verify the characteristics of various special purpose diodes and transistors.

	Course Outcomes for R18 Regulation II-Semester II Year II Sem		
Course Code	**COURSE NAME**	**CO No.**	**Course Outcomes**
C221	LAPLACE TRANSFORMS, NUMERICAL METHODS & COMPLEX VARIABLES (MA401BS)	**C221.1**	Apply Laplace Transforms to solve ordinary differential equations
		C221.2	Estimate unknown values for a given data using Interpolation and method of least squares.
		C221.3	Apply numerical methods to solve algebraic and transcendental equations.
		C221.4	Apply numerical methods to evaluate definite integrals and solve initial value problems.
		C221.5	Analyze the complex functions with reference to their analyticity
		C221.6	Apply the knowledge of complex functions to evaluate various integrals.
C222	ELECTRO MAGNETIC FIELDS AND WAVES (EC402PC)	**C222.1**	Apply the laws of electrostatics for different types of charge distributions
		C222.2	Apply the laws of magneto-statics for different types of current distributions
		C222.3	Analyze boundary conditions using Maxwell's equations at different

			media interfaces
		C222.4	Examine the propagation of EM waves in different media
		C222.5	Analyze the reflection and refraction of plane waves in dielectrics.
		C222.6	Compare various modes of microwave transmission lines.
C223	ANALOG AND DIGITAL COMMUNICATIONS (EC403PC)	**C223.1**	Analyze various modulation/demodulation techniques of amplitude modulation.
		C223.2	Explain various modulation / demodulation techniques of angle modulation.
		C223.3	Classify various types of transmitters and receivers used in AM and FM
		C223.4	Analyze different types of pulse modulation techniques and multiplexing schemes.
		C223.5	Demonstrate the error representation mechanism in various PCM techniques
		C223.6	Analyze different types of digital modulation techniques and optimal reception of signal
C224	LINEAR IC APPLICATIONS (EC404PC)	**C224.1**	Describe the fundamentals of integrated circuits and Op-Amp
		C224.2	Design Op-Amp circuits for basic applications.
		C224.3	Choose appropriate regulator based on the type of application
		C224.4	Design filters and oscillators using Op-Amp
		C224.5	Use IC 555 and IC 565 for different analog applications.
		C224.6	Differentiate between various types of data converters.
C225	ELECTRONIC CIRCUIT ANALYSIS (EC405PC)	**C225.1**	Build different types of multistage amplifiers.
		C225.2	Analyze high frequency response of BJT amplifiers
		C225.3	Categorize different feedback amplifier circuits
		C225.4	Design various types of power and tuned amplifiers for specific applications
		C225.5	Design multivibrators for various applications
		C225.6	Design time-based generators using various techniques
C226	ANALOG AND DIGITAL COMMUNICATION LAB (EC406PC)	**C226.1**	Analyze the spectrum of various analog modulation techniques
		C226.2	Design a multiplexing system using FDM
		C226.3	Examine various pulse modulation techniques
		C226.4	Analyze different digital modulation and demodulation schemes
C227	IC APPLICATION LAB (EC407PC)	**C227.1**	Design analog circuits for practical applications using Op Amp IC-741
		C227.2	Design waveform generators and PLL circuits using ICs
		C227.3	Design multi vibrators using IC555 and Schmitt trigger using IC741
		C227.4	Analyze the practical applications of Voltage Regulator using various ICs.
C228	ELECTRONIC CIRCUIT ANALYSIS LAB (EC408PC)	**C228.1**	Design, simulate and verify basic amplifier circuits.
		C228.2	Design, simulate and verify feedback amplifiers and oscillators.
		C228.3	Design, simulate and verify power amplifier circuits.
		C228.4	Design, simulate and verify Multivibrators and Sweep Circuits.
C229	GENDER SENSITIZATION LAB (MC 409)	**C229.1**	Develop a better understanding of important issues related to gender in contemporary India.
		C229.2	Analyze basic dimensions of the biological, sociological, psychological and legal aspects of gender.
		C229.3	Develop a sense of appreciation of women in all walks of life and will be equipped to work and live together as equals.

		C229.4	Examine the new laws for women protection & relief, and empower students to understand and respond to gender violence.

III Year II Sem – R18

C321	ANTENNAS AND PROPAGATION (EC601PC)	**C321.1**	Apply the basic concepts of various antenna parameters like antenna pattern, radiation intensity, directivity, etc in antenna design.
		C321.2	Analyze radiation pattern of linear wire antennas
		C321.3	Examine the geometry of various types of antennas.
		C321.4	Design different antenna arrays for improving the gain in desired direction
		C321.5	Measure antenna parameters to assess antenna's performance.
		C321.6	Analyze the characteristics of wave propagation in different layers of atmosphere
C322	DIGITAL SIGNAL PROCESSING (EC602PC)	**C322.1**	nine the behavior of LTI systems by solving difference equation
		C322.2	Understand the concepts of multi rate digital signal processing
		C322.3	Analyze digital signals in frequency domain using DFS and DFT
		C322.4	Compute DFT using FFT algorithms
		C322.5	Design and implement IIR and FIR digital filters
		C322.6	Analyze the effects of finite word length representation
C323	VLSI DESIGN (EC603PC)	**C323.1**	Summarize the steps in VLSI fabrication process of different MOS Technologies
		C323.2	Examine the electrical properties and models of CMOS circuits.
		C323.3	Construct layouts using stick diagrams in accordance with the design rules.
		C323.4	Implement complex digital logic circuits using switch logic and PLDs.
		C323.5	Build different VLSI subsystems using CMOS logic.
		C323.6	Explore the concept of testing and fault tolerant systems.
C324	OBJECT ORIENTED PROGRAMMING THROUGH JAVA (EC611PE)	**C324.1**	Develop programs using OOP concepts in Java
		C324.2	Choose use of Interfaces, Abstract classes and packages for Java applications
		C324.3	Choose I/O functionality to read from and write to text files
		C324.4	Analyze multithreading and exception handling mechanism for java applications
		C324.5	Employ Collections in Java Application to store and Manipulate the data
		C324.6	Construct GUI applications using Applet, AWT and Swings
C325	MOBILE COMMUNICATIONS AND NETWORKS (EC612PE)	**C325.1**	Understand various techniques that improves the efficiency of cellular communication system
		C325.2	Design an effective cellular system considering the effects of co-channel and non co-channel interferences
		C325.3	Explore the factors that affect signal coverage in various contours
		C325.4	Understand the concepts of frequency management and effective channel assignment
		C325.5	Assimilate the concept of handoff mechanism and dropped call
		C325.6	Elucidate the concept of Adhoc networks and design goals of MAC layer
C326	EMBEDDED SYSTEM DESIGN (EC613PE)	**C326.1**	Distinguish the embedded systems from general purpose processing systems.
		C326.2	Recommend suitable hardware for different applications of embedded

			systems.
		C326.3	Select different types and amount of memory based on embedded system specifications.
		C326.4	Explain the Embedded firmware design approaches, development languages and device drivers
		C326.5	Analyze the issues and techniques of Task synchronization and communication in embedded firmware.
		C326.6	Differentiate between general purpose operating systems and RTOS.
C327	FUNDAMENTALS OF MANAGEMENT FOR MANAGERS	**C327.1**	Understand the concept of Management and its significance.
		C327.2	Analyse different Organizational Structures to meet contemporary challenges in Human Resource Management.
		C327.3	Analyse and Study different principles in Operations Management.
		C327.4	Evaluate and Understand Marketing Management and Supply Chain Strategies.
		C327.5	Develop Project Management Techniques to estimate the optimal cost of the project.
		C327.6	Understand and explore Contemporary Management Practices in their domain area of Engineering.
C328	ENTREPRENEURSHIP	**C328.1**	Understand the ability to discern distinct entrepreneurial traits for entrepreneurial development.
		C328.2	Familiarize the concept of Establishing New Ventures.
		C328.3	Analyse the challenges of MSMEs and Rehabilitation of sick units.
		C328.4	Develop essential Marketing Strategies for Pricing, Service and Branding.
		C328.5	Evaluate the Strategic perspectives in Entrepreneurship.
		C328.6	Apply the Entrepreneurial mindset to become a successful Entrepreneur.
C329	DIGITAL SIGNAL PROCESSING LAB (EC604PC)	**C329.1**	Generate sinusoidal and noise waveforms using different approaches.
		C329.2	Analyze Impulse and frequency response of various digital filters.
		C329.3	Verify different algorithms of DSP through simulation.
		C329.4	Implement various DSP algorithms in hardware.
C32A	E-CAD LAB (EC605PC)	**C32A.1**	Verify the functionality of digital circuits using Xilinx ISIM simulator
		C32A.2	Implement digital circuits on various FPGA boards using Xilinx tools
		C32A.3	Design layout for digital circuits and perform physical verification
		C32A.4	Analyze static timing, IR drop and crosstalk in digital circuit layouts
C32B	SCRIPTING LANGUAGES LAB (EC606PC)	**C32B.1**	Design and test programs to solve mathematical problems
		C32B.2	Develop programs Using Ruby Script
		C32B.3	Develop Programs Using TCL Script
		C32B.4	Develop Programs Using Perl Script
C32C	ENVIRONMENTAL SCIENCE (MC609)	**C32C.1**	Discover knowledge regarding environment and its components.
		C32C.2	Understand the classification, importance and conservation of natural resources.
		C32C.3	Perceive the knowledge regarding different Bio -Geo classification of India.
		C32C.4	Examine impacts of pollution on the environment and their control measures.

		C32C.5	Analyze Environmental laws and Environmental Impact Assessments.
		C32C.6	Determine sustainable development that aims to meet raising human needs.

IV Year II Sem – R18

C421	SATELLITE COMMUNICATIONS (EC811PE)	**C421.1**	Demonstrate the principles of satellite communication systems
		C421.2	Design a satellite link for specified C/N ratio
		C421.3	Analyze the effects of propagation on satellite signals.
		C421.4	Analyze the performance efficiency of various multiple access techniques.
		C421.5	Explain Earth station technology and GPS.
		C421.6	Analyze the satellite packet communications
C422	RADAR SYSTEMS (EC812PE)	**C422.1**	Analyze the performance of Radar System and its parameters.
		C422.2	Analyze the functionality of CW and FMCW radar.
		C422.3	Classify the mechanism of detecting stationary and moving targets
		C422.4	Compare the working mechanism of various tracking radars.
		C422.5	Analyze the radar signal in noisy environment.
		C422.6	Assess various components and parameters of Radar receivers
C423	WIRELESS SENSOR NETWORKS (EC813PE)	**C423.1**	Acquire knowledge about sensor networks, its types and applications
		C423.2	Understand issues, challenges and technologies of wireless sensor networks
		C423.3	Understand the various routing and MAC protocols
		C423.4	Apply various data dissemination methods for sensor networks
		C423.5	Understand the design principles of WSN and communication strategies
		C423.6	Understand the requirement of hardware and software to implement WSN
C424	SYSTEM ON CHIP ARCHITECTURE (EC821PE)	**C424.1**	Illustrate the Features and Components of System Architecture
		C424.2	Choose the suitable processor for SoC design
		C424.3	Examine different memory organization and interfacing techniques in SoC
		C424.4	Interpret the Cache organization in SoC Memory Design
		C424.5	Investigate the methods of interconnection and SoC customization
		C424.6	Analyze reconfiguration strategies used in SoC design
C425	TEST AND TESTABILITY (EC822PE)	**C425.1**	Identify the need for testing and categorize the different problems involved in testing
		C425.2	Summarize types of faults and choose appropriate fault models.
		C425.3	Illustrate the methods for test generation in combinational circuits
		C425.4	Analyze the pseudo random test pattern generation techniques using Linear Feedback Shift Registers and Cellular Automata.
		C425.5	Categorize DFT techniques for combinational circuits
		C425.6	Illustrate the methods for test generation in sequential circuits
C426	LOW POWER VLSI DESIGN (EC823PE)	**C426.1**	Summarize various sources of power dissipation in low power circuits
		C426.2	Illustrate the need for low power circuit design and analyze the effects of short channel
		C426.3	Categorize the special techniques to mitigate the power consumption in VLSI circuits
		C426.4	Analyze the architectural approaches to design low power, low voltage adder and multiplier circuits

		C426.5	Interpret the performance of low power, low voltage memory architectures
		C426.6	Compare different technology trends for low voltage low power logic styles
C427	R-PROGRAMMING	**C427.1**	Explore the Basic Knowledge of R and able to do in the programming language R
		C427.2	Develop Programs using Control Structures and vectors
		C427.3	Make Use of the concepts of Lists and Data Frames for programming
		C427.4	Experiment with factors and tables
		C427.5	Make use of R to solve statistical problems
		C427.6	Interpret different Object-Oriented Programming Concepts
C428	PROJECT STAGE-II (EC801PC)	**C428.1**	Implement the project plan complying with deadlines
		C428.2	Validate the design to meet the specifications
		C428.3	Evaluate the results to derive the conclusion and provide scope for future enhancement.
		C428.4	Integrate Information from multiple sources and write a comprehensive report
		C428.5	Demonstrate technical, interpersonal and leadership skills in a team

BVRIT HYDERABAD

College of Engineering for Women

Rajiv Gandhi Nagar, Bachupally, Hyderabad -90

Department of Computer Science and Engineering

Course Outcomes for R22 Regulation I-Semester			
I Year I Sem			
Course Code	**Course Name**	**CO. No.**	**Course Outcomes**
C111	**MATRICES AND CALCULUS (MA101BS)**	**C111.1**	Solve the system of linear equations using appropriate methods
		C111.2	Analyze the nature of quadratic form using eigen values and eigen vectors
		C111.3	Derive infinite series expansions of differentiable functions using generalized mean value theorems
		C111.4	Evaluate improper integrals using Beta and Gamma functions
		C111.5	Optimize a given function with respect to given constrains
		C111.6	Estimate area or volumes of few geometries using multiple integration
C112	**ENGINEERING CHEMISTRY (CH102BS)**	**C112.1**	Analyze the basic properties of water and its usage in domestic and industrial purposes.
		C112.2	Inspect the working principles and reaction mechanisms of various energy storage devices
		C112.3	Acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
		C112.4	Impart the fundamental knowledge and sustainability implemented through smart engineering materials.
		C112.5	Distinguish various energy sources to prioritise eco friendly fuels for environmental sustainable development.
		C112.6	Discriminate the limitations of conventional basic engineering materials for developing multiphase materials.
C113	**PROGRAMMING FOR PROBLEM SOLVING (CS103ES)**	**C113.1**	Understand the basics of algorithms and flowcharts for solving problems.
		C113.2	Implement control structures in C programming language.
		C113.3	Apply the knowledge of derived data types &use of pre processor commands to solve problems.
		C113.4	Explore dynamic memory allocation and file handling functions using C.
		C113.5	Develop reusable code using concept of modular programming.
		C113.6	Demonstrate various searching and sorting techniques along with their time complexities
C114	**BASIC ELECTRICAL ENGINEERING (EE104ES)**	**C114.1**	Analyze DC electric circuits with basic electrical components.
		C114.2	Analyze single phase and three phase AC circuits.
		C114.3	Illustrate the performance of transformers.
		C114.4	Explain the construction of DC and AC machines
		C114.5	Explain the working Principle of DC and AC machine

		C114.6	Differentiate various components in electrical installations
C115	**COMPUTER AIDED ENGINEERING GRAPHICS (ME105ES)**	**C115.1**	Construct different types of non circular curves and scales used in various engineering applications.
		C115.2	Analyze the projections of points and lines.
		C115.3	Analyze the projections of planes and solids.
		C115.4	Apply different types of sectional planes to get the interior features of the objects by means of sectional views
		C115.5	Develop the surfaces to fabricate the objects.
		C115.6	Identify orthographic, Isometric projections and various CAD commands.
C116	**ELEMENTS OF COMPUTER SCIENCE & ENGINEERING (CS106ES)**	**C116.1**	Understand the purpose of various components of a basic computer, significance of essentials in software development.
		C116.2	Understand the functionalities of various operating systems.
		C116.3	Understand the basics of organization and management of databases.
		C116.4	Understand the types of connectivity, applications and security issues, fundamentals of self - driven systems.
C117	**ENGINEERING CHEMISTRY LABORATORY (CH107BS)**	**C117.1**	Analysis of materials using small quantities of materials involved for quick and accurate results
		C117.2	Interpret a new application by the analysis of physical principle involved in various instruments.
		C117.3	Develop experimental skills in building technological advances by qualitative and quantitative analysis of materials.
		C117.4	Learn and apply basic techniques used in chemistry laboratory for preparation, purification and identification.
C118	**PROGRAMMING FOR PROBLEM SOLVING LABORATORY (CS108ES)**	**C118.1**	Build programs using control structures to solve simple mathematical problems.
		C118.2	Develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
		C118.3	Develop searching and sorting algorithms using C programs.
		C118.4	Build programs using control structures to solve simple mathematical problems.
C119	**BASIC ELECTRICAL ENGINEERING LABORATORY (EE109ES)**	**C119.1**	Analysis of materials using small quantities of materials involved for quick and accurate results
		C119.2	Interpret a new application by the analysis of physical principle involved in various instruments.
		C119.3	Develop experimental skills in building technological advances by qualitative and quantitative analysis of materials.
		C119.4	Learn and apply basic techniques used in chemistry laboratory for preparation, purification and identification.
Course Outcomes for R18 Regulation I-Semester			
II Year I Sem			
Course Code	**Course Name**	**CO. No.**	**Course Outcomes**
C211	**ANALOG AND DIGITAL ELECTRONICS (CS301ES)**	**C211.1**	Analyze the construction, principle of operation and characteristics of PN junction diode.
		C211.2	Differentiate various types of diodes and their applications.
		C211.3	Analyze the construction, principle of operation, characteristics and applications of BJT and FET.

		C211.4	Design biasing circuits to maintain stable operating point based on given specifications.
		C211.5	Realize logic circuits using diodes and transistors.
		C211.6	Design and analyze simple combinational and sequential circuits.
C212	**DATA STRUCTURES (CS302ES)**	**C212.1**	Experiment with various operations on Stacks and queues.
		C212.2	Implement various operations on linear data structures and its applications.
		C212.3	Design programs using a variety of data structures like Hash Table Representation.
		C212.4	Experiment with various operations on non linear data structures.
		C212.5	Choose appropriate sorting technique for a given problem.
		C212.6	Exploring Pattern matching algorithms and suffix Tries.
C213	**COMPUTER ORIENTED STATISTICAL METHODS (CS304PC)**	**C213.1**	Distinguish between discrete and continuous probability. Distributions.
		C213.2	Analyze and interpret statistical data using appropriate probability distributions.
		C213.3	Apply sampling distributions in real world problems.
		C213.4	Estimate the value for a given parameter by choosing appropriate method.
		C213.5	Apply suitable test to accept or reject a given hypothesis.
		C213.6	Apply Stochastic process and Markov process to solve various problems.
C214	**COMPUTER ORGANIZATION AND ARCHITECTURE (CS304PC)**	**C214.1**	Implement Micro-operations in Design, Organization and Architecture of a basic computer.
		C214.2	Design a suitable Control unit for a decided set of Instructions.
		C214.3	Design Hardware and Algorithms for manipulation of data, represented in different formats.
		C214.4	Implement data transfer with appropriate IO Interface and Interrupt mechanism.
		C214.5	Choose suitable type of Memory for given purpose
		C214.6	Perform Parallel Processing using suitable mechanism
C215	**OBJECT ORIENTED PROGRAMMING USING C++ (CS305PC)**	**C215.1**	Make use of object oriented paradigm with concepts of classes and objects.
		C215.2	Design and Implement programs using C++
		C215.3	Apply concepts of Inheritance in real time problems.
		C215.4	Design solutions for real time problems using Polymorphism and Abstract classes.
		C215.5	Apply features of stream I/O, various file handling techniques in C++
		C215.6	Analyze the concept Exception handling using C++
C216	**ANALOG AND DIGITAL ELECTRONICS LAB (CS306ES)**	**C216.1**	Analyze the characteristics of Full wave rectifier.
		C216.2	Analyze the characteristics of different Transistor amplifier configurations.
		C216.3	Implement Boolean expressions using universal logic gates.
		C216.4	Design and verify simple combinational and sequential circuits using IC s of different logic families.

C217	**DATA STRUCTURES LAB (CS307PC)**	**C217.1**	Implement various linear data structures.
		C217.2	Implement various non linear data structures.
		C217.3	Compare various searching and sorting algorithms.
		C217.4	Ability to implement trees and graphs traversals.
C218	**IT WORKSHOP LAB (CS308PC)**	**C218.1**	Construct a Personal Computer and prepare the computer ready to use.
		C218.2	Prepare the Documents & slide presentations using Word processors and presentation tools.
		C218.3	Apply internet concepts to connect two or more computers for information sharing.
		C218.4	Build a dual mode operating system PC by installing OS Software.
C219	**C++ PROGRAMMING LAB (CS309PC)**	**C219.1**	Apply Object oriented features and C++ concepts.
		C219.2	Apply the concept of polymorphism and inheritance.
		C219.3	Implement exception handling and templates.
		C219.4	Develop applications using Console I/O and File I/O.
C21A	**GENDER SENSITIZATION LAB (MC309)**	**C21A.1**	Develop a better understanding of important issues related to gender in contemporary India
		C21A.2	Analyze basic dimensions of the biological, sociological, psychological and legal aspects of gender
		C21A.3	Develop a sense of appreciation of women in all walks of life and will be equipped to work and live together as equals.
		C21A.4	Examine the new laws for women protection & relief, and empower students to understand and respond to gender violence
III Year I Sem			
C311	**FORMAL LANGUAGES AND AUTOMATA THEORY (CS501PC)**	**C311.1**	Design FA machines, minimize, and achieve conversions among them.
		C311.2	Make use of Regular expressions and Test for regular languages
		C311.3	Derive sentential forms from CFG and remove ambiguity
		C311.4	Minimize and design recognizers for CFG.
		C311.5	Design appropriate Turing Machine for a given problem
		C311.6	Identify undecidability in NREL, REL and RL
C312	**SOFTWARE ENGINEERING (CS502PC)**	**C312.1**	Illustrate process framework and models for the development based on nature of the software.
		C312.2	Analyze the requirements to select a model and for preparation of SRS document.
		C312.3	Choose appropriate model to create architecture by using design principles.
		C312.4	Apply various testing strategies to validate the software quality.
		C312.5	Illustrate the importance of product metrics in software development.
		C312.6	Develop reliable software by managing risk and following Quality Standards.
C313	**COMPUTER NETWORKS**	**C313.1**	Examine various reference models in terms of protocols, layer interfaces, connecting and grouping of users.

	(CS503PC)	**C313.2**	Analyze counter measures like error detection, correction, flow control and medium access protocols in data link layer.
		C313.3	Identify the suitable routing algorithm in Network layer.
		C313.4	Identifying suitable hardware components for connecting hosts based on location.
		C313.5	Assess the connection management and congestion control of TCP protocols and services of various protocols in Application layer.
		C313.6	Analyze the security threats and counter mechanism to handle.
C314	**WEB TECHNOLOGIES (CS504PC)**	**C314.1**	Design dynamic web based applications using PHP
		C314.2	Design static web applications using HTML
		C314.3	Analyze XML tags and parsing of XML data in Java
		C314.4	Develop server side programming using servlet and connect to the database using JDBC
		C314.5	Develop server side programming using JSP and connect to the database using JDBC
		C314.6	Validate the web application at the client side using javascript
C315	**INFORMATION THEORY & CODING (CS511PE)**	**C315.1**	Calculate information, entropy, mutual information and channel capacity for various channels
		C315.2	Compare various source coding techniques in terms of their efficiency
		C315.3	Inspect error detection and correction in linear block codes
		C315.4	Design encoder and decoder for various codes
		C315.5	Analyze the applicability of source and channel codes
		C315.6	Devise Minimum distance and BCH bounds and procedure of decoding BCH codes
C316	**ADVANCED COMPUTER ARCHITECTURE (CS512PE)**	**C316.1**	Identify different computational models and Computer Architectures.
		C316.2	Analyze operation of parallel processing and memory hierarchy and the range of performance issues influencing its design.
		C316.3	Classify the performance of different pipelined &non- pipelined processors.
		C316.4	Analyze architectural features of advanced processors like Superscalar processors, multiprocessors.
		C316.5	Choose multiprocessors & thread level parallelism using shared, distributed memory models.
		C316.6	Develop the design techniques of Scalable and multithreaded Architecture.
C317	**DATA ANALYTICS (CS513PE)**	**C317.1**	Fetch data from various sources and make it ready for analysis
		C317.2	Make use of various tools and technologies for data analysis
		C317.3	Apply regression techniques to data and evaluate performance
		C317.4	build supervised and unsupervised learning models for object segmentation
		C317.5	Build models for time series and evaluate performance
		C317.6	Visualize the data and interpret the insights exist in data
C318	**IMAGE PROCESSING (CS514PE)**	**C318.1**	Demonstrate the knowledge of the basic concepts of the two-dimensional signal acquisition, sampling and quantization and its

			applications of Image Processing
		C318.2	Model of spatial and frequency filtering technique for image enhancement.
		C318.3	Demonstration of the knowledge of 2Dimensional transformation techniques.
		C318.4	Implement the image enhancement, segmentation, restoration, and compression techniques and problems.
		C318.5	Implement image processing algorithms using Open Source / Image Processing Tools / Mat lab Software
		C318.6	Professional Contribution in the field of Digital Image Processing
C319	**PRINCIPLES OF PROGRAMMING LANGUAGES (CS515PE)**	**C319.1**	Identify the building blocks of various Programming languages
		C319.2	Implement various methods to describe syntax and semantics of programming languages
		C319.3	Examine fundamentals like Data types, Control Structures etc. of various programming languages
		C319.4	Make use of Subprograms and ADT in implementing business logic
		C319.5	Apply the techniques to handle Concurrency, Exceptions and Events in programming
		C319.6	Outline Functional, Logic and Scripting Programming Language Concept
C31A	**COMPUTER GRAPHICS (CS521PE)**	**C31A.1**	Analyze the functionality of various Input , output devices
		C31A.2	Design algorithms for primitive components and to fill 2-D shapes
		C31A.3	Perform transformations and create views for 2-D co-ordinates
		C31A.4	Perform transformations and create views for 3-D co-ordinates
		C31A.5	Apply surface detection methods
		C31A.6	Design and Create a Graphics Visualization and its applications using OpenGL or Open source software
C31B	**ADVANCED OPERATING SYSTEMS (CS522PE)**	**C31B.1**	Draw inference on the various design approaches of advanced operating systems
		C31B.2	Analyze the design issues of distributed operating systems.
		C31B.3	Inspect and Identify the advantages and challenges in designing distributed algorithms for different primitives like mutual exclusion, deadlock detection, agreement, etc.
		C31B.4	Examine design issues and computational performance of multi-processor operating systems.
		C31B.5	Identify the requirements of Distributed File System and Distributed Shared Memory.
		C31B.6	Analyze how computing power is created and synchronized in Distributed systems
C31C	**INFORMATION RETRIEVAL SYSTEMS (CS523PE)**	**C31C.1**	Implementing Information Retrieval system capabilities and Digital Libraries
		C31C.2	Implement the Indexing and the Data Structures
		C31C.3	Compute the Automatic indexing, Document and term clustering .
		C31C.4	Apply user search techniques to improve the information visualization.
		C31C.5	Implementation of Text Search Algorithms.
		C31C.6	Build the working model for multimedia information retrieval system.

C31D	**DISTRIBUTED SYSTEMS (CS524PE)**	**C31D.1**	Analyze the architecture and design of distributed database systems.
		C31D.2	Explore the objectives and algorithms for distributed query processing.
		C31D.3	Examine the mechanisms of concurrency control and deadlock management.
		C31D.4	Evaluate the measures of distributed systems reliability and fault tolerance.
		C31D.5	Illustrate the importance of parallel database systems.
		C31D.6	Examine the concepts of object oriented database management systems.
C31E	**NATURAL LANGUAGE PROCESSING (CS525PE)**	**C31E.1**	Outline the sensitivity to linguistic phenomena and ability to model using syntax, semantics and pragmatics with formal grammars.
		C31E.2	Students will able to understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
		C31E.3	Manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods with ambiguity resolution.
		C31E.4	Design, implement, and analyze NLP algorithms for a given Natural Language tasks.
		C31E.5	Design different language Modeling Techniques using AI and ML algorithms.
		C31E.6	Design Applications of Natural Language Processing using open source / Python / NLTK and Natural Language Tools.
C31F	**SOFTWARE ENGINEERING LAB (CS505PC)**	**C31F.1**	Analyze the problem and identify project scope and objectives and analyze the software requirements and prepare SRS document.
		C31F.2	Develop risk strategy and QA techniques for developing quality software
		C31F.3	Design the software using UML diagrams
		C31F.4	Design the test case document
C31G	**COMPUTER NETWORKS AND WEB TECHNOLOGIES LAB (CS506PC)**	**C31G.1**	Implement various algorithms of data link, network, transport and presentation layer.
		C31G.2	Evaluate data transmission techniques and monitor the network traffic using appropriate simulation tools.
		C31G.3	Develop web applications using Client Side Technologies HTML, CSS, Javas cript and XML
		C31G.4	Develop web applications using Server Side Technologies PHP, Servlet and JSP
C31H	**ADVANCED COMMUNICATION SKILLS LAB (EN508HS)**	**C31H.1**	Build sound vocabulary and use functional English effectively
		C31H.2	Analyze the given text and respond appropriately and develop efficacious writing skills
		C31H.3	Develop effective speaking skills and maximize job prospects
		C31H.4	Plan and make different forms of presentation using various techniques
C31I	**INTELLECTUAL PROPERTY RIGHTS (MC510)**	**C31I.1**	Discuss the fundamental aspects of Intellectual property Rights which play a major role in development and management of innovative projects in industries.
		C31I.2	Examine Trademarks, Acquisition of Trade Mark Rights and its

			registration processes.
		C31I.3	Evaluate various aspects relating to copyrights and its procedure for registration processes.
		C31I.4	Evaluate with the Trade Secret Law, protection for submission, Unfair Competition
		C31I.5	Evaluate on the International Developments in Intellectual Property Rights
		C31I.6	Interpret about current trends in IPR and the steps taken by the Government of India in fostering IPR
C31J	**ARTIFICIAL INTELLIGENCE**	**C31J.1**	Possess the ability to formulate an efficient problem space for a problem expressed in English
		C31J.2	Possess the ability to select a search algorithm for a problem and characterize its time and space complexities
		C31J.3	Possess the skill for representing knowledge using the appropriate technique for a given problem
		C31J.4	Apply and evaluate AI techniques to solve problems of Machine learning and Natural Language Processing
		C31J.5	Choose and implement appropriate learning algorithms for a given problem.
		C31J.6	Create an expert system to simulate behaviour of a person
IV Year I Sem			
C411	**CRYPTOGRAPHY AND NETWORK SECURITY (CS701PC)**	**C411.1**	Illustrate the concepts and principles of security Attacks, Services and Mechanisms.
		C411.2	Evaluate applications of Cryptographic algorithms in real time scenarios.
		C411.3	Demonstrate the techniques like Message authentication, Hash function and public key encryption.
		C411.4	Solve the network security issues using available security solutions.
		C411.5	Assess different key management techniques and solutions for web security.
		C411.6	Analyze various case studies to identify the security vulnerabilities and prevention techniques.
C412	**DATA MINING (CS702PC)**	**C412.1**	Examine data mining tasks, KDD process and challenges.
		C412.2	Apply Data Preprocessing techniques to make data sets ready to be mining.
		C412.3	Identify the frequent patterns and association rules from transactional datasets.
		C412.4	Classify the real world data into appropriate classes using various supervised learning techniques and measure its performance.
		C412.5	Apply clustering and outlier detection techniques on given data sets and evaluate goodness measures.
		C412.6	Classify web pages and extract knowledge from the web and text data.
C 413	**GRAPH THEORY (CS711PE)**	**C413.1**	Know some important classes of graph-theoretic problems and the usage of graph theory as a modeling tool.
		C413.2	Formulate the central theorems about trees, matching, connectivity, coloring, and planar graphs.
		C413.3	Describe some basic algorithms for graphs.
		C413.4	The Graph theory as a Modeling tool for presentable in Applications.

		C413.5	Learn the fundamental concepts in graph theory in view of its applications in modern science and create mathematical proofs.
		C413.6	Use the concepts of Graph theory in subsequent courses in the design and analysis of Graph algorithms.
C 414	**INTRODUCTION TO EMBEDDED SYSTEMS (CS712PE)**	**C414.1**	Distinguish the embedded systems from general purpose processing systems.
		C414.2	Recommend suitable hardware for different applications of embedded systems.
		C414.3	Select different types and amount of memory based on embedded system specifications.
		C414.4	Discuss the Embedded firmware design approaches, development languages and device drivers
		C414.5	Analyze the issues and techniques of Task synchronization and communication in embedded firmware.
		C414.6	Differentiate between general purpose operating systems and RTOS.
C415	**ARTIFICIAL INTELLIGENCE (CS713PE)**	**C415.1**	To Formulate different search Algorithms and developing problem solving ability
		C415.2	Understand propositional logic and identify constraints satisfaction problems
		C415.3	Improve logic and draw the inferences
		C415.4	Ability to do reasoning and knowledge representation for various categories of information
		C415.5	Define various classical planning approaches applied to real world
		C415.6	Understand probabilistic reasoning and various learning mechanisms
C416	**CLOUD COMPUTING (CS714PE)**	**C416.1**	Understand various types of computing paradigms.
		C416.2	Identify the need for Cloud Computing and its essential characteristics.
		C416.3	Analyze Cloud architecture, network connectivity and its applications.
		C416.4	Analyze management in Cloud infrastructure and approaches of Cloud migration.
		C416.5	Identify Cloud environment using Infrastructure as a Service (IaaS) , PaaS and SaaS.
		C416.6	Analyze Cloud era by different platforms.
C417	**ADHOC AND SENSOR NETWORKS (CS715P)**	**C417.1**	Apply the basic characteristics and routing in Mobile Ad-hoc Networks (MANETS)
		C417.2	Analyze the data transmission in MANETs and the usage of TCP over MANETs and understand MANETs and WSN for Industry and research point
		C417.3	Ability to solve the issues in real time application development based on Geo casting
		C417.4	Demonstrate the ability to solve security related problems using Routing protocols
		C417.5	Understand the basics of WSN and various layers
		C417.6	Choose appropriate tools for WSN simulation
C418	**ADVANCED ALGORITHMS**	**C418.1**	Analyze complex problems using advanced data structures
		C418.2	Analyze complex problems using advanced data structures (stacks,

	(CS721PE)		queues, linked lists, graphs and trees)
		C418.3	Model real life problem using different algorithm design techniques
		C418.4	Apply different design techniques to solve network related problems.
		C418.5	Choose proper pattern matching algorithm for given problem
		C418.6	Analyze NP and NP hard problems
C419	**REAL -TIME SYSTEMS (CS852PE)**	**C419.1**	Apply the commands for file I/O and process Control
		C419.2	Implement time management & task management in the real time operating systems
		C419.3	Analyze the communication among processes during concurrency
		C419.4	Configure different components of I/O
		C419.5	Handle Exceptions & Interrupts
		C419.6	Distinguish functionalities of various real time operating systems namely RT Linux,Vx Works,MicroC/OS-II, Tiny OS and Embedded Linux
C41A	**SOFT COMPUTING (CS723PE)**	**C41A.1**	Identify the difference between hard and soft computing
		C41A.2	Understand fuzzy logic and reasoning to handle and solve engineering problems
		C41A.3	Identify the difference between problem solving and decision making
		C41A.4	Implement the particle swarm optimizations for various applications
		C41A.5	Perform various operations of genetic algorithms, Rough Sets.
		C41A.6	Create various models to integrate soft computing techniques
C41B	**INTERNET OF THINGS (CS724PE)**	**C41B.1**	Inference the impact and challenges posed by IoT networks leading to new architectural models.
		C41B.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
		C41B.3	Appraise the role of IoT protocols for efficient network communication.
		C41B.4	Elaborate python programming with various interfacing devices using with Raspberry PI.
		C41B.5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.
		C41B.6	Construct a restful web API.
C41C	**SOFTWARE PROCESS AND PROJECT MANAGEMENT (CS734PE)**	**C41C.1**	Analyze the Software process maturity levels for Process Improvement and Process Assessment.
		C41C.2	Explore the Software Management Renaissance in Economics.
		C41C.3	Evaluate Life cycle phases and Artifacts in Project Management.
		C41C.4	Examine the role of workflows and checkpoints in process planning.
		C41C.5	Illustrate the importance of Project Organization, Project control and process instrumentation in Project Management.
		C41C.6	Evaluate the Project management practices with Case Studies.
C41D	**ELECTRONIC SENSORS (CS734PE)**	**C41D.1**	Illustrate the characteristics and operating principles of Sensors
		C41D.2	Summarize the construction and operation of various Electro

			Mechanical Sensors.
		C41D.3	Analyze the working principles and applications of different Thermal Sensors
		C41D.4	Explore the working principles of different Magnetic Sensors
		C41D.5	Utilize Radiation and Electro Analytical Sensors to compute radiation and various electrical parameters.
		C41D.6	Make use of smart sensors to measure different physical parameters and apply them in various Fields
C41E	**CRYPTOGRAPHY AND NETWORK SECURITY LAB (CS703PC)**	**C41E.1**	Compare various cryptographic techniques to encode and decode the given text.
		C41E.2	Develop solutions using symmetric key algorithms.
		C41E.3	Build solutions using public key cryptographic algorithms.
		C41E.4	Analyze various secure hash algorithms to generate hash key.
C41F	**SEMINAR (CS705PC)**	**C41F.1**	Identify emerging topic specific to the programme.
		C41F.2	Extract the information relevant to the chosen topic.
		C41F.3	Deliver the knowledge using multimedia.
		C41F.4	Answer the queries with appropriate explanation and elaboration.
		C41F.5	Compile an effective technical report, providing conclusions and proposing an appropriate future scope.
C41G	**PROJECT STAGE-I (CS706PC)**	**C41G.1**	Identify problem, conduct literature survey and formalize it.
		C41G.2	Analyze and propose an efficient, cost-effective and eco-friendly solution using relevant tools and technologies.
		C41G.3	Finalize the design plan and implement at least one module of the project.
		C41G.4	Demonstrate effective communication and report writing skills.
		C41G.5	Recognize the need for team work and exhibit professional ethics.

Course Outcomes for R22 Regulation II-Semester			
I Year II Sem			
C121	**ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (MA201BS)**	**C121.1**	Solve geometrical and physical problems using first order and first degree differential equations
		C121.2	Solve higher order linear differential equations with constant coefficients
		C121.3	Evaluate Laplace and inverse Laplace transforms of various functions
		C121.4	Apply Laplace Transforms to solve ordinary differential equations
		C121.5	Analyze the properties of Differential Operators
		C121.6	Evaluate the line, surface, and volume integrals using their inter-relationships
C122	**APPLIED PHYSICS (PH202BS)**	**C122.1**	Understand physical world from fundamental point of view by the concepts of Quantum mechanics and classify the solids
		C122.2	Identify the role of semiconductor devices in science and engineering Applications.
		C122.3	Explore the fundamental properties of dielectric, magnetic and energy materials for their applications
		C122.4	Appreciate the features and applications of Nanomaterials
		C122.5	Understand various aspects of Lasers and their applications in diverse fields
		C122.6	Explain principle of optical fibers and their significance in communication
C123	**ENGINEERING WORKSHOP (ME203ES)**	**C123.1**	Distinguish carpentry, fitting, black smithy and welding manufacturing processes.
		C123.2	Develop house hold and engineering goods from metallic sheets in tin smithy.
		C123.3	Apply basic electrical engineering knowledge for house wiring practice.
		C123.4	Construct a sand mould for a given pattern using foundry tools.
C124	**ENGLISH FOR SKILL ENHANCEMENT (EN204HS)**	**C124.1**	Apply English language effectively in spoken and written forms
		C124.2	Analyze the given texts and respond appropriately
		C124.3	Apply various grammatical structures in personal and academic fronts.
		C124.4	Make use of appropriate vocabulary for professional communication
		C124.5	Apply English language competency in various forms of academic and professional writing.
		C124.6	Communicate effectively during presentations, interviews and collaborative projects.
C125	**ELECTRONIC DEVICES AND CIRCUITS (EC205ES)**	**C125.1**	Analyze the characteristics of PN junction diode.
		C125.2	Construct diode circuits for various applications.
		C125.3	Illustrate the transistor working in different configurations.
		C125.4	Differentiate between FET and BJT devices.
		C125.5	Illustrate the operation and characteristics of special purpose diodes.
		C125.6	Use diode and transistor as switches in electronic circuits.
C126	**PYTHON**	**C126.1**	Build basic programs using fundamental programming constructs.

	PROGRAMMING LABORATORY (CS206ES)	**C126.2**	Explore Strings, Lists, Tuples and Dictionaries in Python
		C126.3	Develop reusable code and GUI application using standard Library
		C126.4	Implement File I/O and Digital Logic Gates using Python
C127	**APPLIED PHYSICS LABORATORY (PH207BS)**	**C127.1**	Estimate the work function of metal using Photoelectric effect and identify the type of semiconductor material whether it is n-type or p-type by Hall effect.
		C127.2	Determine energy gap and resistivity of semiconductors and draw the characteristics of semiconductor and optoelectronic devices.
		C127.3	Understand the electrical and magnetic properties of materials.
		C127.4	Demonstrate the working principle of lasers and optical fibers.
C128	**ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY (EN208HS)**	**C128.1**	Understand nuances of English language through audio-visual experience
		C128.2	Write professional documents such as letters, reports and projects.
		C128.3	Use neutralized accent for intelligibility
		C128.4	Demonstrate production skills during interviews,presentations, collaborative projects.
C129	**IT WORKSHOP (CS209ES)**	**C129.1**	Understand Hardware components and inter dependencies
		C129.2	Safeguard computer systems from viruses/worms
		C129.3	Preparations of Documents and Interactive presentations
		C129.4	Perform calculations using spreadsheets
C12A	**ENVIRONMENTAL SCIENCE (MC210)**	**C12A.1**	Discover knowledge regarding environment and its components.
		C12A.2	Understand the classification, importance and conservation of natural resources.
		C12A.3	Perceive the knowledge regarding different Bio -Geo classification of India.
		C12A.4	Examine impacts of pollution on the environment and their control measures.
Course Outcomes for R18 Regulation I-Semester			
II Year II Sem			
C221	**DISCRETE MATHEMATICS (CS401PC)**	**C221.1**	Apply mathematical logic to prove reason and infer various compound statements.
		C221.2	Model the mathematical problems using sets, functions and relations.
		C221.3	Prove mathematical results using various forms of Induction techniques.
		C221.4	Solve the counting problems on finite and discrete structures.
		C221.5	Solve the recursive functions by converting into recurrence relations.
		C221.6	Construct graphs to solve appropriate real-world problems.
C222	**BUSINESS ECONOMICS AND FINANCIAL ANALYSIS (SM405MS)**	**C222.1**	Understand the Economic Concepts in business decision making process.
		C222.2	Familiarize with the cost concepts, market structures.
		C222.3	Make use of breakeven analysis, CVP Analysis, pricing strategies.
		C222.4	Examine financial accounting and analyze various financial statements.
		C222.5	Interpret various financial statements by applying different types of

			ratios.
		C222.6	Examine the usefulness of funds flow statement and cash flow statement for better managerial decisions.
C223	**OPERATING SYSTEMS (CS403PC)**	**C223.1**	Analyze the functionalities and structure of a generic Operating System.
		C223.2	Evaluate various CPU scheduling algorithms.
		C223.3	Analyze process synchronization and IPC mechanisms.
		C223.4	Assess the techniques of deadlock avoidance and prevention.
		C223.5	Examine different Memory management techniques.
		C223.6	Explore file system interface and its operations.
C224	**DATABASE MANAGEMENT SYSTEMS (CS404PC)**	**C224.1**	Identify and classify the components of Database system.
		C224.2	Model the data using ER model and convert into Relational Model.
		C224.3	Access and manipulate the data in the databases.
		C224.4	Refine the database schema to improve data consistency.
		C224.5	Ensure the properties of transactions on databases.
		C224.6	Examine different file organizations and indexing methods.
C225	**JAVA PROGRAMMING (CS405PC)**	**C225.1**	Illustrate Object Oriented concepts and basics of java programming.
		C225.2	Make use of the concepts of packages and Interfaces.
		C225.3	Implement the concepts of multithreading and /or handle run time errors for Java applications.
		C225.4	Utilize collection framework and /or file management in Java applications.
		C225.5	Design real time applications using event handling concepts.
		C225.6	Develop real time GUI applications using applet, AWT, JDBC and swings.
C226	**OPERATING SYSTEMS LAB (CS406PC)**	**C226.1**	Evaluate CPU Scheduling Algorithms and Memory management techniques.
		C226.2	Construct deadlock detection and avoidance algorithms.
		C226.3	Solve classical problems of synchronization using semaphores.
		C226.4	Evaluate inter process communication mechanisms using system calls and pipes.
C227	**DATABASE MANAGEMENT SYSTEMS LAB (CS407PC)**	**C227.1**	Design conceptual model (E-R model) for the given database.
		C227.2	Formulate the queries using DML, DDL, DCL commands.
		C227.3	Enforce integrity constraints on databases.
		C227.4	Implement triggers, stored procedures and cursors.
C228	**JAVA PROGRAMMING LAB (CS405PC)**	**C228.1**	Make use of JDK, Eclipse platform for developing java programs.
		C228.2	Build programs using abstract classes and multithreading concepts.
		C228.3	Develop programs using GUI components.
		C228.4	Develop Programs using Quick Sort and Bubble Sort.
C229	**CONSTITUTION OF INDIA**	**C229.1**	Understand the historical perspective of Constitution of India.
		C229.2	Analyze the features and Characteristics of Constitution of India.

		C229.3	Understand the concepts of Fundamental Rights and Duties of Indian Citizens.
		C229.4	Examine The Directive Principles of State Policy.
		C229.5	Understand the Parliamentary form of Government in India.
		C229.6	Examine the emergency provisions: National Emergency, President Rule and Financial Emergency.
III Year II Sem			
C321	**MACHINE LEARNING (CS601PC)**	**C321.1**	Formulate the problems of searching that converge to correct hypothesis using concept and decision tree learning.
		C321.2	Interpret face recognition, learning robot control with ANN
		C321.3	Apply Bayesian classification, Naïve Bayes theorem to analyze several learning algorithms.
		C321.4	Evaluate the accuracy of learned hypothesis with statistical methods and analyze the operations of algorithm
		C321.5	Apply genetic, sequential algorithms to perform simulated evaluation of learning and optimization problems
		C321.6	Formulate the general hypothesis with inductive and analytical learning.
C322	**COMPILER DESIGN (CS602PC)**	**C322.1**	Illustrate the functionality of compiler phases.
		C322.2	Apply practical aspects of automata theory.
		C322.3	Design parsers for a given CFG.
		C322.4	Construct SDT for various aspects including Intermediate Code.
		C322.5	Make use of relevant data structures.
		C322.6	Apply various code generation and optimization techniques.
C323	**DESIGN AND ANALYSIS OF ALGORITHMS (CS603PC)**	**C323.1**	Analyze the performance of algorithms and represent using relevant notations.
		C323.2	Model real world applications using sets graphs and trees.
		C323.3	Explore basic techniques for designing algorithm using divide – conquer & Greedy approach to various problems.
		C323.4	Identify suitable design paradigms to improve the solution space using Dynamic Programming & Backtracking method.
		C323.5	Reduce the search space of a problem using bounding functions.
		C323.6	Categorize problems into NP hard & NP Complete.
C324	**CONCURRENT PROGRAMMING (CS611PE)**	**C324.1**	Understand the use of shared objects for communication and co-ordination among concurrent processes.
		C324.2	Apply mutual exclusion and condition synchronization in multithreaded processes.
		C324.3	Design concurrent programs using blocking and non-blocking concurrent objects
		C324.4	Solve synchronization problems by identifying a set of primitive synchronization operations.
		C324.5	Implement multithreading using various synchronization mechanisms.
		C324.6	Implement concurrent queues and stacks to achieve high degree of

			parallelism.
C325	**NETWORK PROGRAMMING (CS612PE)**	**C325.1**	Examine major protocols used for inter process communication
		C325.2	Analyzing Client server communication, elementary UDP Sockets programming, I/o multiplexing
		C325.3	Apply the concepts related to Inter process communication using sockets.
		C325.4	Explain network services that communicate through Internet
		C325.5	Access various kinds of Broadcasting and Multicasting mechanisms.
		C325.6	Design robust socket-based applications
C326	**SCRIPTING LANGUAGES (CS613PE)**	**C326.1**	Make use of resources to gain some fluency programming in Ruby, Perl, TCL and TK
		C326.2	Analyze the features of Ruby by embedding in different ways
		C326.3	Understanding the Perl by utilizing the advanced features
		C326.4	Explain syntax, variables and various features of TCL
		C326.5	Elaborate strengths and weakness TCL and select an appropriate language for solving a given problem
		C326.6	Examine the TK by embedding in different ways
C327	**MOBILE APPLICATION DEVELOPMENT (CS614PE)**	**C327.1**	Analyze the features, components and life cycle of Android Operating system
		C327.2	Design Android application with UI components, Fragments and event handling
		C327.3	Identify the importance of intents in Android applications development
		C327.4	Develop Android applications using broadcasts and notifications
		C327.5	Examine the data persistence mechanism using Files and Shared Preferences
		C327.6	Develop Android application to perform operations with SQLite database
C328	**SOFTWARE TESTING METHODOLOGIES (CS615PE)**	**C328.1**	Identify the need of testing and understand the use of path testing
		C328.2	Compare and contrast transaction flow testing, dataflow testing and domain testing strategies
		C328.3	Examine path products, expressions, regular expression and flow anomaly detection in testing process.
		C328.4	Choose appropriate path expression, KV charts, specifications in logic based testing.
		C328.5	Analyze state graphs, graph matrix and their applications in transition testing.
		C328.6	Analyze graph matrices, matrix properties and their applications in building tools like JMeter, Win-runner etc.
C329	**FUNDAMENTALS OF INTERNET OF THINGS (EC600OE)**	**C329.1**	Inference the impact and challenges posed by IoT networks leading to new architectural models.
		C329.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
		C329.3	Appraise the role of IoT protocols for efficient network communication.

		C329.4	Elaborate python programming with various interfacing devices using with Raspberry PI.
		C329.5	Construct a IoT application using Raspberry Pi, to handle data and perform analytics.
		C329.6	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry
C32A	**MACHINE LEARNING LAB (CS604PC)**	**C32A.1**	Compare Machine Learning algorithms based on their advantages and limitations and use the best one according to situation
		C32A.2	Interpret and understand modern notions in data analysis-oriented computing
		C32A.3	Apply common Machine Learning algorithms in practice and implement.
		C32A.4	Experiment with real-world data using Machine Learning algorithms.
C32B	**COMPILER DESIGN LAB (CS605PC)**	**C32B.1**	Identify the practical approach of how a compiler works
		C32B.2	Construct top down and bottom up parse tools
		C32B.3	Construct LEX and YACC programs
		C32B.4	Develop new computer languages
C32C	**CONCURRENT PROGRAMMING LAB (CS621PE)**	**C32C.1**	Implement mutual exclusion, dead lock free and starvation free multi thread programming.
		C32C.2	Create concurrent FIFO queue data structure using multi thread programming
		C32C.3	Design a consensus object by implementing mutual exclusion lock using CompareAndSet( ) Primitive
		C32C.4	Apply multithread programming to implement List, stack and queue using atomic primitives
C32D	**NETWORK PROGRAMMING LAB (CS622PE)**	**C32D.1**	Develop inter process communication using pipes, message queue & shared memory
		C32D.2	Design and implement client-server applications using TCP and UDP sockets
		C32D.3	Implement peer to peer communication
		C32D.4	Analyze Network programs
C32E	**SCRIPTING LANGUAGES LAB (CS623PE)**	**C32E.1**	Design and test programs to solve mathematical problems
		C32E.2	Develop programs Using Ruby Script
		C32E.3	Develop Programs Using TCL Script
		C32E.4	Develop Programs Using Perl Script
C32F	**MOBILE APPLICATION DEVELOPMENT LAB (CS624PE)**	**C32F.1**	Design Android User Interface using Layouts and components
		C32F.2	Design android applications using menus, notifications and files
		C32F.3	Develop Android application to persist data in Files, Shared Preferences and SQLite databases
		C32F.4	Develop Android application based on Alarm and URL
C32G	**SOFTWARE TESTING METHODOLOGIES LAB (CS625PE)**	**C32G.1**	Examine selenium tool to perform functional testing
		C32G.2	Develop test scripts using selenium tool

		C32G.3	Apply advanced features of Selenium to automate the use cases
		C32G.4	Build test scripts on automation of web based and windows-based applications
C32H	**ENVIRONMENTAL SCIENCES (MC609)**	**C32H.1**	Discover knowledge regarding environment and its components.
		C32H.2	Understand the classification, importance and conservation of natural resources.
		C32H.3	Perceive the knowledge regarding different Bio -Geo classification of India.
		C32H.4	Examine impacts of pollution on the environment and their control measures.
		C32H.5	Analyze Environmental laws and Environmental Impact Assessments.
		C32H.6	Determine sustainable development that aims to meet raising human needs.
C32I	**CYBER SECURITY**	**C32I.1**	Analyze and evaluate the cyber security needs of an organization.
		C32I.2	Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation
		C32I.3	Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.
		C32I.4	Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators
		C32I.5	Design and develop a security architecture for an organization.
		C32I.6	Design operational and strategic cyber security strategies and policies.
IV Year II Sem			
C421	**ORGANIZATIONAL BEHAVIOR (EE833OE)**	**C421.1**	Analyze the behavior of individuals and groups in Organizations
		C421.2	Analyze the factors that influence Organizational behavior
		C421.3	Examine the potential effects of organizational level factors on organizational behavior.
		C421.4	Analyze potential effects of important developments in the external environment on Organizational behavior.
		C421.5	Examine the role of globalization and advances in technology on Organizational behavior.
		C421.6	Analyze organizational behavior theories, models and concepts.
C422	**COMPUTATIONAL COMPLEXITY (CS741PE)**	**C422.1**	Analyze the computational complexity and classify algorithms into appropriate complexity classes.
		C422.2	Construct reduction of problem.
		C422.3	Analyze algorithmic paradigms and choose appropriate paradigm for a given problem.
		C422.4	Choose appropriate randomized algorithms for pattern recognition.
		C422.5	Compare various graph based algorithms for approximation and randomization problems.
		C422.6	Apply suitable data structure for complex applications.

C423	**DISTRIBUTED SYSTEMS (CS812PE)**	**C423.1**	Classify the various distributed systems, challenges and models.
		C423.2	Evaluate the importance of clock, process synchronization and debugging of distributed systems.
		C423.3	Examine the protocol for inter process communication and distributed objects.
		C423.4	Explore distributed file system, naming services and shared memory for distributed systems.
		C423.5	Categorize the distinct transactions mechanism and locks.
		C423.6	Inspect concurrency control and recovery mechanisms for distributed systems.
C424	**NEURAL NETWORKS AND DEEP LEARNING (CS864PE)**	**C424.1**	Ability to understand the concepts of Neural Networks
		C424.2	Ability to select the Learning Networks in modeling real world systems
		C424.3	Ability to understand deep learning architectures
		C424.4	Ability to use an efficient algorithm for Deep Models
		C424.5	Ability to use Regularizations for deep learning
		C424.6	Ability to apply optimization strategies for large scale applications
C425	**HUMAN COMPUTER INTERACTION (CS814PE)**	**C425.1**	Elaborate the design of good Interface and features of GUI
		C425.2	Compare the Human interaction speed with computers
		C425.3	Apply visually pleasing composition of elements on screen design
		C425.4	Identify Various Navigation Schemes, Screen based controls in user interface design
		C425.5	Design effective HCI for individuals
		C425.6	Ability to design certain tools for blind or PH people.
C426	**CYBER FORENSICS (CS815PE)**	**C426.1**	Understand the fundamentals of Cyber Crime
		C426.2	Analyze the nature and effect of cybercrime in society.
		C426.3	Demonstrate Accounting Forensics.
		C426.4	Analyze Computer Crime and Criminals and Liturgical Procedures.
		C426.5	Apply the laws and regulations to the applications
		C426.6	Analyze the email tracking cyber applications.
C427	**BASICS OF POWER PLANT ENGINEERING (EE800OE)**	**C427.1**	Understand the components and layouts of various power plants.
		C427.2	Analyze Rankine Cycle in coal-based power plants and Brayton Cycle in Gas turbine power plants
		C427.3	Elucidate various nuclear reactors
		C427.4	Discuss the principles of various non-conventional energy power plants
		C427.5	Examine the economic aspects for electrical power generation
		C427.6	Apply various pollution control techniques in power plants.
C428	**PROJECT STAGE-II (CS802PC)**	**C428.1**	Implement the remaining modules or features of the project complying with timelines.
		C428.2	Demonstrate the functionality of the project and evaluate the results.
		C428.3	Derive the conclusion to provide scope for future enhancement.

		C428.4	Integrate the findings of Stage-I & Stage-II and prepare a comprehensive report.
		C428.5	Exhibit technical, inter personal land leadership skills with individual contribution.

BVRIT HYDERABAD

College of Engineering for Women

Rajiv Gandhi Nagar, Bachupally, Hyderabad -90

Department of Computer Science and Engineering

(Artificial Intelligence and Machine Learning)

Course Outcomes for R22 Regulation I-Semester			
I Year I Sem			
Course Code	**Course Name**	**CO. No.**	**Course Outcomes**
C111	**MATRICES AND CALCULUS (MA101BS)**	**C111.1**	Solve the system of linear equations using various methods
		C111.2	Analyze the nature of quadratic form using eigen values and eigen vectors
		C111.3	Test the convergence or divergence of a given series
		C111.4	Derive infinite series expansions from mean value theorems
		C111.5	Evaluate multiple and improper integrals with some application
		C111.6	Optimize a given function with respect to given contrains
C112	**APPLIED PHYSICS (PH102BS)**	**C112.1**	Understand the basic electronic modifications that reflect on properties of materials for advance design of materials.
		C112.2	Analyze the basic properties of water and its usage in domestic and industrial purposes.
		C112.3	Inspect the working principles of electrochemical systems for the production of various energy storage devices.
		C112.4	Analyze engineering problems related corrosion, metal finishing and use of appropriate design criteria in achieving a practical solution.
		C112.5	Design the materials that impact the natural and technological environments with the knowledge of stereo chemistry.
		C112.6	Evaluate the materials behavior at micro scale by spectroscopy which determines the development of materials for many real-world applications.
C113	**PROGRAMMING FOR PROBLEM SOLVING (CS103ES)**	**C113.1**	Understand the basics of algorithms and flowcharts for solving problems
		C113.2	Implement control structures using C programming language
		C113.3	Apply the knowledge of derived data types & use of preprocessor commands to solve problems
		C113.4	Explore dynamic memory allocation and file handling functions using C
		C113.5	Develop reusable code using the concept of modular programming.
		C113.6	Demonstrate various searching and sorting techniques along with their time complexities
C114	**ENGINEERING WORKSHOP (ME104ES)**	**C114.1**	Distinguish carpentry, fitting ,black smithy and welding manufacturing processes.
		C114.2	Develop house hold and engineering goods from metallic sheets in tin smithy.
		C114.3	Apply asic electrical engineering knowledge for house wiring practice.

		C114.4	Construct as and mould for a given pattern using foundry tools.
C115	**ENGLISH FOR SKILL ENHANCEMENT (EN105HS)**	**C115.1**	Discuss on manufacturing of components using various trades like fitting, carpentry, welding and Black-smithy.
		C115.2	Develop house hold and engineering goods from metallic sheets in tin smithy.
		C115.3	Apply basic electrical engineering knowledge for house wiring practice.
		C115.4	Prepare a sand mould for a given pattern using foundry tools.
C116	**ELEMENTS OF COMPUTER SCIENCE & ENGINEERING (CS106ES)**	**C116.1**	Understand the purpose of various components of a basic computer, significance of essentials in software development.
		C116.2	Understand the functionalities of various operating systems.
		C116.3	Understand the basics of organization and management of databases.
		C116.4	Understand the types of connectivity, applications and security issues, fundamentals of self - driven systems.
C117	**APPLIED PHYSICS LABORATORY (PH107BS)**	**C117.1**	Estimate the work function of metal using Photoelectric effect and identify the type of semiconductor material whether it is n-type or p-type by Hall effect.
		C117.2	Determine energy gap and resistivity of semiconductors and draw the characteristics of semiconductor and optoelectronic devices.
		C117.3	Understand the electrical and magnetic properties of materials
		C117.4	Demonstrate the working principle of lasers and optical fibers
C118	**PROGRAMMING FOR PROBLEM SOLVING LABORATORY (CS108ES)**	**C118.1**	Build programs using control structures to solve simple mathematical problems
		C118.2	Apply the concepts of user defined, pre-defined and file handling functions
		C118.3	Develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
		C118.4	Develop searching and sorting algorithms using C programs
C119	**ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY (EN109HS)**	**C119.1**	Understand the nuances of English language through audio - visual experience
		C119.2	Apply soft skills effectively while working in group activities
		C119.3	Create Neutralize accent for intelligibility
		C119.4	Understand and Discuss with clarity and confidence which in turn enhances their employability skills
Course Outcomes for R18 Regulation I-Semester			
II Year I Sem			
Course Code	**Course Name**	**CO. No.**	**Course Outcomes**
C211	**DISCRETE MATHEMATICS (CS310PC)**	**C211.1**	Apply mathematical logic to prove reason and infer various compound statements.
		C211.2	Model the mathematical problems using sets, functions and relations.
		C211.3	Prove mathematical results using various forms of Induction techniques.
		C211.4	Solve the counting problems on finite and discrete structures.
		C211.5	Solve the recursive functions by converting into recurrence

			relations.
		C211.6	Construct graphs to solve appropriate real-world problems.
C212	**DATA STRUCTURES (CS302PC)**	**C212.1**	Experiment with various operations on Stacks and queues.
		C212.2	Implement various operations on linear data structures and its applications.
		C212.3	Design programs using a variety of data structures like Hash Table Representation.
		C212.4	Experiment with various operations on non linear data structures.
		C212.5	Choose appropriate sorting technique for a given problem.
		C212.6	Exploring Pattern matching algorithms and suffix Tries.
C213	**MATHEMATICAL AND STATISTICAL FOUNDATIONS (MA313BS)**	**C213.1**	Distinguish between discrete and continuous probability. Distributions.
		C213.2	Analyze and interpret statistical data using appropriate probability distributions.
		C213.3	Apply sampling distributions in real world problems.
		C213.4	Estimate the value for a given parameter by choosing appropriate method.
		C213.5	Apply suitable test to accept or reject a given hypothesis.
		C213.6	Apply Stochastic process and Markov process to solve various problems.
C214	**COMPUTER ORGANIZATION AND ARCHITECTURE (CS304PC)**	**C214.1**	Implement Micro-operations in Design, Organization and Architecture of a basic computer.
		C214.2	Design a suitable Control unit for a decided set of Instructions.
		C214.3	Design Hardware and Algorithms for manipulation of data, represented in different formats.
		C214.4	Implement data transfer with appropriate IO Interface and Interrupt mechanism.
		C214.5	Choose suitable type of Memory for given purpose
		C214.6	Perform Parallel Processing using suitable mechanism
C215	**PYTHON PROGRAMMING (CS311PC)**	**C215.1**	Apply techniques to manipulate data using python core basis.
		C215.2	Distinguish the use of in-built functions, create user defined functions
		C215.3	Distinguish Lists, Tuples, Sets and dictionaries
		C215.4	Develop Object- Oriented programming as well as in depth data and information processing techniques to python program
		C215.5	Elaborate GUI applications using python
		C215.6	Model the design the high performance programs and strengthen the practical expertise
C216	**BUSINESS ECONOMICS & FINANCIAL ANALYSIS (SM306MS)**	**C216.1**	Understand the Economic Concepts in business decision making process.
		C216.2	Familiarize with the cost concepts, market structures.
		C216.3	Make use of break even analysis, CVP Analysis, pricing strategies.
		C216.4	Examine financial accounting and analyze various financial statements.
		C216.5	Interpret various financial statements by applying different types of ratios.

		C216.6	Examine the usefulness of funds flow statement and cash flow statement for better managerial decisions.
C217	**DATA STRUCTURES LAB (CS307PC)**	**C217.1**	Implement various linear data structures.
		C217.2	Implement various non linear data structures.
		C217.3	Compare various searching and sorting algorithms.
		C217.4	Ability to implement trees and graphs traversals.
C218	**PYTHON PROGRAMMING LAB (CS312PC)**	**C218.1**	Develop the application specific codes using python.
		C218.2	Understand Strings, Lists, Tuples and Dictionaries in Python
		C218.3	Verify programs using modular approach, file I/O, Python standard library
		C218.4	Implement Digital Systems using Python
C219	**GENDER SENSITIZATION LAB (MC309)**	**C219.1**	Develop a better understanding of important issues related to gender in contemporary india.
		C219.2	Analyze basic dimensions of the biological, sociological, psychological and legal aspects of gender
		C219.3	Develop a sense of appreciation of women in all walks of life and will be equipped to work and live together as equals.
		C219.4	Examine the new laws for women protection & relief, and empower students to understand and respond to gender violence.
III Year I Sem			
C311	**DESIGN AND ANALYSIS OF ALGORITHMS**	**C311.1**	Analyze the performance of algorithms and represent using relevant notations.
		C311.2	Model real world applications using sets graphs and trees.
		C311.3	Explore basic techniques for designing algorithm using divide – conquer & Greedy approach to various problems.
		C311.4	Identify suitable design paradigms to improve the solution space using Dynamic Programming & Backtracking method.
		C311.5	Reduce the search space of a problem using bounding functions.
		C311.6	Categorize problems into NP hard & NP Complete.
C312	**MACHINE LEARNING**	**C312.1**	Formulate the problems of searching that converge to correct hypothesis using concept and decision tree learning.
		C312.2	Interpret face recognition, learning robot control with ANN
		C312.3	Apply Bayesian classification, Naïve Bayes theorem to analyze several learning algorithms.
		C312.4	Evaluate the accuracy of learned hypothesis with statistical methods and analyze the operations of algorithm
		C312.5	Apply genetic, sequential algorithms to perform simulated evaluation of learning and optimization problems
		C312.6	Formulate the general hypothesis with inductive and analytical learning.
C313	**COMPUTER NETWORKS**	**C313.1**	Examine various reference models in terms of protocols, layer interfaces, connecting and grouping of users.
		C313.2	Analyze counter measures like error detection, correction, flow control and medium access protocols in data link layer.

		C313.3	Identify the suitable routing algorithm in Network layer.
		C313.4	Identifying suitable hardware components for connecting hosts based on location.
		C313.5	Assess the connection management and congestion control of TCP protocols and services of various protocols in Application layer.
		C313.6	Analyze the security threats and counter mechanism to handle.
C314	**COMPILER DESIGN**	**C314.1**	Illustrate the functionality of compiler phases.
		C314.2	Apply practical aspects of automata theory.
		C314.3	Design parsers for a given CFG.
		C314.4	Construct SDT for various aspects including Intermediate Code.
		C314.5	Make use of relevant data structures.
		C314.6	Apply various code generation and optimization techniques.
C315	**GRAPH THEORY (PE-1)**	**C315.1**	Know some important classes of graph theoretic problems
		C315.2	Describe and apply some basic algorithms for graphs;
		C315.3	Formulate and prove central theorems about trees,
		C315.4	Describe the minimum spanning tree algorithms.
		C315.5	Analyze matching, connectivity of planar graphs and algorithms.
		C315.6	Explore graph on vertex colorings and algorithms for edge coloring.
C316	**INTRODUCTION TO DATA SCIENCE**	**C316.1**	Evaluate the implications of Big Data and Explore statistical inference techniques.
		C316.2	Apply the basic concepts of R programming including environment setup and manipulation of basic data types.
		C316.3	Classify different types of data attributes and understand the principles of measurement.
		C316.4	Analyse structured data through vectors, matrices, arrays, factors, data frames, and lists in R programming.
		C316.5	Implement operators, iterative programming and functions in R.
		C316.6	Develop various data reduction techniques.
C317	**WEB PROGRAMMING**	**C317.1**	Fetch data from various sources and make it ready for analysis
		C317.2	Make use of various tools and technologies for data analysis
		C317.3	Apply regression techniques to data and evaluate performance
		C317.4	build supervised and unsupervised learning models for object segmentation
		C317.5	Build models for time series and evaluate performance
		C317.6	Visualize the data and interpret the insights exist in data
C318	**IMAGE PROCESSING**	**C318.1**	Demonstrate the knowledge of the basic concepts of the two-dimensional signal acquisition, sampling and quantization and its applications of Image Processing
		C318.2	Model of spatial and frequency filtering technique for image enhancement.
		C318.3	Demonstration of the knowledge of 2Dimensional transformation techniques.
		C318.4	Implement the image enhancement, segmentation, restoration,

			and compression techniques and problems.
		C318.5	Implement image processing algorithms using Open Source / Image Processing Tools / Matlab Software
		C318.6	Professional Contribution in the field of Digital Image Processing
C319	**COMPUTER GRAPHICS**	**C319.1**	Identify the building blocks of various Programming languages
		C319.2	Implement various methods to describe syntax and semantics of programming languages
		C319.3	Examine fundamentals like Data types, Control Structures etc. of various programming languages
		C319.4	Make use of Subprograms and ADT in implementing business logic
		C319.5	Apply the techniques to handle Concurrency, Exceptions and Events in programming
		C319.6	Outline Functional, Logic and Scripting Programming Language Concept
C31A	**SOFTWARE TESTING METHODOLOGIES**	**C31A.1**	Identify the need of testing and understand the use of path testing
		C31A.2	Compare and contrast transaction flow testing, dataflow testing and domain testing strategies
		C31A.3	Examine path products, expressions, regular expression and flow anomaly detection in testing process.
		C31A.4	Choose appropriate path expression, KV charts, specifications in logic based testing.
		C31A.5	Analyze state graphs, graph matrix and their applications in transition testing.
		C31A.6	Analyze graph matrices, matrix properties and their applications in building tools like JMeter, Win-runner etc.
C31B	**INFORMATION RETRIEVAL SYSTEMS**	**C31B.1**	Explore IR principles to locate relevant information large collections of data
		C31B.2	Design different document clustering algorithms
		C31B.3	Implement retrieval systems for web search tasks.
		C31B.4	Design an Information Retrieval System for web search tasks.
		C31B.5	Understand the data/file structures that are necessary to design.
		C31B.6	Implement information retrieval (IR) systems.
C31C	**PATTERN RECOGNITION**	**C31C.1**	Understand the theory, benefits of pattern recognition
		C31C.2	Identify inadequacies and possible applications of various machine learning and pattern recognition algorithms
		C31C.3	Identify suitable machine learning techniques in classification, pattern recognition
		C31C.4	Employ suitable pattern recognition techniques for decision problems.
		C31C.5	Implementation of SVM and Neural Networks
		C31C.6	Explore various clustering techniques.
C31D	**COMPUTER VISION AND ROBOTICS**	**C31D.1**	Implement fundamental image processing techniques required for computer vision.
		C31D.2	Implement boundary tracking techniques.
		C31D.3	Explore segmentation techniques.
		C31D.4	Apply chain codes and other region descriptors, Hough Transform

			for line, circle, and ellipse detections.
		C31D.5	Apply 3D vision techniques and Implement motion related techniques.
		C31D.6	Develop applications using computer vision techniques.
C31E	**DATA WAREHOUSING AND BUSINESS INTELLIGENCE**	**C31E.1**	Understand architecture of data warehouse and OLAP operations
		C31E.2	Understand Fundamental concepts of BI and Analytics
		C31E.3	Explore application of BI Key Performance indicators
		C31E.4	Design of Dashboards, Implementation of Web Analytics
		C31E.5	Understand Utilization of Advanced BI Tools and their Implementation.
		C31E.6	Implementation of BI Techniques and BI Ethics.
C318	**MACHINE LEARNING LAB**	**C318.1**	Compare Machine Learning algorithms based on their advantages and limitations and use the best one according to situation
		C318.2	Interpret and understand modern notions in data analysis-oriented computing
		C318.3	Apply common Machine Learning algorithms in practice and implement.
		C318.4	Experiment with real-world data using Machine Learning algorithms.
C319	**COMPUTER NETWORKS LAB**	**C319.1**	Implement data link layer farming methods
		C319.2	Analyze error detection and error correction codes
		C319.3	Implement and analyze routing and congestion issues in network design.
		C319.4	Implement Encoding and Decoding techniques used in presentation layer
C31A	**ADVANCED COMMUNICATION SKILLS LAB**	**C31A.1**	Build sound vocabulary and use functional English effectively
		C31A.2	Analyze the given text and respond appropriately and develop efficacious writing skills
		C31A.3	Develop effective speaking skills and maximize job prospects
		C31A.4	Plan and make different forms of presentation using various techniques
C31C	**INTELLECTUAL PROPERTY RIGHTS (MC510)**	**C31C.1**	Understand the fundamental aspects of Intellectual property Rights who are going to play a major role in development and management of innovative projects in industries.
		C31C.2	Examine Trademarks, Acquisition of Trade Mark Rights and its registration processes.
		C31C.3	Evaluate various aspects relating to copyrights and its procedure for registration processes.
		C31C.4	Evaluate with the Trade Secret Law, protection for submission, Unfair Competition.
		C31C.5	Evaluate on the International Developments in Intellectual Property Rights.
		C31C.6	Interpret about current trends in IPR and the steps taken by the Government of India in fostering IPR.
C31D	**ARTIFICIAL INTELLEGANCE**	**C31D.1**	Possess the ability to formulate an efficient problem space for a problem expressed in English

		C31D.2	Possess the ability to select a search algorithm for a problem and characterize its time and space complexities
		C31D.3	Possess the skill for representing knowledge using the appropriate technique for a given problem
		C31D.4	Apply and evaluate AI techniques to solve problems of Machine learning and Natural Language Processing
		C31D.5	Choose and implement appropriate learning algorithms for a given problem.
		C31D.6	Create an expert system to simulate behavior of a person

Course Outcomes for R22 Regulation II-Semester			
I Year II Sem			
C121	**ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (MA201BS)**	**C121.1**	Solve geometrical and physical problems using first order and first degree differential equation.
		C121.2	Solve higher order linear differential equations with constant coefficients
		C121.3	Evaluate double and triple integrals
		C121.4	Estimate area, volume, center of mass and gravity using multiple integration
		C121.5	Analyze the properties of Differential Operators
		C121.6	Evaluate the line, surface, and volume integrals using their inter-relationships
C122	**ENGINEERING CHEMISTRY (CH202BS)**	**C122.1**	Apply the knowledge of quantum mechanics to realize the dual nature of matter.
		C122.2	Discuss types of semiconducting materials and their characteristics.
		C122.3	Describe the importance of optoelectronic devices in Engineering.
		C122.4	Discuss types of lasers and their applications
		C122.5	Explain optical fibers and their significance in communication.
		C122.6	Make use of principles of magnetism and Dielectrics in modern technology.
C123	**COMPUTER AIDED ENGINEERING GRAPHICS (ME203ES)**	**C123.1**	Draw the characteristics of optoelectronic devices.
		C123.2	Assess the performance of electrical circuits.
		C123.3	Estimate the Electrical properties of materials.
		C123.4	Demonstrate working of lasers and optical fibers.
C124	**BASIC ELECTRICAL ENGINEERING (EE204ES)**	**C124.1**	Analyze DC electric circuits with basic electrical components.
		C124.2	Analyze single phase and three phase AC circuits.
		C124.3	Illustrate the performance of transformers.
		C124.4	Explain the construction of DC and AC machines
		C124.5	Explain the working Principle of DC and AC machine
		C124.6	Differentiate various components in electrical installations
C125	**ELECTRONIC DEVICES AND CIRCUITS (EC205ES)**	**C125.1**	Analyze the characteristics of PN junction diode.
		C125.2	Construct diode circuits for various applications.
		C125.3	Illustrate the transistor working in different configurations.
		C125.4	Differentiate between FET and BJT devices.
		C125.5	Illustrate the operation and characteristics of special purpose diodes.

		C125.6	Use diode and transistor as switches in electronic circuits.
C126	PYTHONPROGRAMMINGLABORATORY (CS206ES)	C126.1	Build basic programs using fundamental programming constructs.
		C126.2	Explore Strings, Lists, Tuples and Dictionaries in Python
		C126.3	Develop reusable code and GUI application using standard Library.
		C126.4	Implement File I/O and Digital Logic Gates using Python
C127	ENGINEERINGCHEMISTRYLABORATORY (CH207BS)	C127.1	Analysis of materials using small quantities of materials involved for quick and accurate results
		C127.2	Interpret a new application by the analysis of physical principle involved in various instruments.
		C127.3	Develop experimental skills in building technological advances by qualitative and quantitative analysis of materials.
		C127.4	Learn and apply basic techniques used in chemistry laboratory for preparation, purification and identification.
C128	BASICELECTRICALENGINEERINGLABORATORY (EE208ES)	C128.1	Measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach
		C128.2	Analyze the transient responses of first order circuits.
		C128.3	Evaluate the performance of Transformers through various testing methods.
		C128.4	Evaluate the performance of DC and AC Motors by direct testing methods.
C129	ITWORKSHOP (CS209ES)	C129.1	Demonstrate the step-by-step installation process of the Operating System.
		C129.2	Evaluate the credibility and reliability of online sources found through search engines.
		C129.3	Use productivity tools like Word processors and Excel for performing calculations & plotting to represent the input data.
		C129.4	Apply the knowledge of Power point and Latex to perform various tasks.
Course Outcomes for R18 Regulation I-Semester			
II Year II Sem			
C221	FORMAL LANGUAGES AND AUTOMATA THEORY (CS416PC)	C221.1	Provide introduction to some of the central ideas of theoretical computer science from the perspective of formal languages.
		C221.2	Introduce the fundamental concepts of formal languages, grammars and automata theory.
		C221.3	Classify machines by their power to recognize languages.
		C221.4	Employ finite state machines to solve problems in computing.

		C221.5	Understand deterministic and non-deterministic machines.
		C221.6	Understand the differences between decidability and undecidability.
C222	**SOFTWARE ENGINEERING (CS417PC)**	**C222.1**	Understand the Economic Concepts in business decision making process.
		C222.2	Familiarize with the cost concepts, market structures.
		C222.3	Make use of breakeven analysis, CVP Analysis, pricing strategies.
		C222.4	Examine financial accounting and analyze various financial statements.
		C222.5	Interpret various financial statements by applying different types of ratios.
		C222.6	Examine the usefulness of funds flow statement and cash flow statement for better managerial decisions.
C223	**OPERATING SYSTEMS (CS403PC)**	**C223.1**	Analyze the functionalities and structure of a generic Operating System.
		C223.2	Evaluate various CPU scheduling algorithms.
		C223.3	Analyze process synchronization and IPC mechanisms.
		C223.4	Assess the techniques of deadlock avoidance and prevention.
		C223.5	Examine different Memory management techniques.
		C223.6	Explore file system interface and its operations.
C224	**DATABASE MANAGEMENT SYSTEMS (CS404PC)**	**C224.1**	Identify and classify the components of Database system.
		C224.2	Model the data using ER model and convert into Relational Model.
		C224.3	Access and manipulate the data in the databases.
		C224.4	Refine the database schema to improve data consistency.
		C224.5	Ensure the properties of transactions on databases.
		C224.6	Examine different file organizations and indexing methods.
C225	**OBJECT ORIENTED PROGRAMMING USING JAVA (CS412PC)**	**C225.1**	Illustrate Object Oriented concepts and basics of java programming.
		C225.2	Make use of the concepts of packages and Interfaces.
		C225.3	Implement the concepts of multithreading and /or handle run time errors for Java applications.
		C225.4	Utilize collection framework and /or file management in Java applications.
		C225.5	Design real time applications using event handling concepts.

		C225.6	Develop real time GUI applications using applet, AWT, JDBC and swings.
C226	**OPERATING SYSTEMS LAB (CS406PC)**	**C226.1**	Evaluate CPU Scheduling Algorithms and Memory management techniques.
		C226.2	Construct deadlock detection and avoidance algorithms.
		C226.3	Solve classical problems of synchronization using semaphores.
		C226.4	Evaluate inter process communication mechanisms using system calls and pipes.
C227	**DATABASE MANAGEMENT SYSTEMS LAB (CS407PC)**	**C227.1**	Design conceptual model (E-R model) for the given database.
		C227.2	Formulate the queries using DML, DDL, DCL commands.
		C227.3	Enforce integrity constraints on databases.
		C227.4	Implement triggers, stored procedures and cursors.
C228	**JAVA PROGRAMMING LAB (CS408PC)**	**C228.1**	Design the state space model of a linear system using simulation.
		C228.2	Analyze the response of systems in frequency & time domain.
		C228.3	Calculate the transfer function and observe the effect of feedback on the systems
		C228.4	Examine the effect of controllers & Compensators on the system.
C229	**CONSTITUTION OF INDIA (MC409)**	**C229.1**	Examine salient features of Indian Constitution and live accordingly in society
		C229.2	Interpret the meaning of Fundamental Rights and Directive Principles of State Policy and, develop an attitude which paves the way for better living conditions.
		C229.3	Discover various aspects of Union Government legislation and live up to the expectations of the rules.
		C229.4	Critically examine State Government legislation and improve your living standards by following the rules strictly
		C229.5	Examine powers and functions of local bodies such as Municipalities and Panchayats and, take advantage of available resources for better living
		C229.6	Analyze the powers and functions of Election Commission and The Union Public Service Commission and decide upon it for safe and secured life.
III Year II Sem			
C321	**ARTIFICIAL INTELLIGENCE**	**C321.1**	Formulate the problems of searching that converge to correct hypothesis using concept and decision tree learning.
		C321.2	Interpret face recognition, learning robot control with ANN
		C321.3	Apply Bayesian classification, Naïve Bayes

			theorem to analyze several learning algorithms.
		C321.4	Evaluate the accuracy of learned hypothesis with statistical methods and analyze the operations of algorithm
		C321.5	Apply genetic, sequential algorithms to perform simulated evaluation of learning and optimization problems
		C321.6	Formulate the general hypothesis with inductive and analytical learning.
C322	**DEVOPS**	**C322.1**	Identify components of Devops environment.
		C322.2	Describe Software development models and architectures of DevOps.
		C322.3	Apply different project management, integration, testing and code deployment tool.
		C322.4	Investigate different DevOps Software development models.
		C322.5	Assess various Devops practices.
		C322.6	Collaborate and adopt Devops in real-time projects.
C323	**NATURAL LANGUAGE PROCESSING**	**C323.1**	Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
		C323.2	Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
		C323.3	Manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.
		C323.4	Design, implement, and analyze NLP algorithms
		C323.5	Design different language modeling Techniques.
		C323.6	Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
C324	**INTERNET OF THINGS**	**C324.1**	Interpret the impact and challenges posed by IoT networks leading to new architectural models.
		C324.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
		C324.3	Appraise the role of IoT protocols for efficient network communication.
		C324.4	Elaborate the need for Data Analytics and Security in IoT.
		C324.5	Illustrate different sensor technologies for sensing real world entities
		C324.6	Identify the applications of IoT in Industry
C325	**DATA MINING**	**C325.1**	Understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
		C325.2	Apply preprocessing methods for any given raw data.
		C325.3	Extract interesting patterns from large amounts

			of data.
		C325.4	Discover the role played by data mining in various fields.
		C325.5	Choose and employ suitable data mining algorithms to build analytical applications
		C325.6	Evaluate the accuracy of supervised and unsupervised models and algorithms.
C326	**SCRIPTING LANGUAGES**	**C326.1**	Comprehend the differences between typical scripting languages
		C326.2	Gain knowledge of the strengths and weakness of Ruby
		C326.3	Gain knowledge of the strengths and weakness of Perl
		C326.4	Typical system and application programming languages and Perl
		C326.5	Gain knowledge of the strengths and weakness of TCL
		C326.6	Acquire programming skills in scripting language.
C327	**MOBILE APPLICATION DEVELOPMENT**	**C327.1**	Analyze the features, components and life cycle of Android Operating system
		C327.2	Design Android application with UI components, Fragments and event handling
		C327.3	Identify the importance of intents in Android applications development
		C327.4	Develop Android applications using broadcasts and notifications
		C327.5	Examine the data persistence mechanism using Files and Shared Preferences
		C327.6	Develop Android application to perform operations with SQLite database
C328	**CRYPTOGRAPHY AND NETWORK SECURITY**	**C328.1**	Illustrate the concepts and principles of security Attacks, Services and Mechanisms.
		C328.2	Evaluate applications of Cryptographic algorithms in real time scenarios.
		C328.3	Demonstrate the techniques like Message authentication, Hash function and public key encryption.
		C328.4	Solve the network security issues using available security solutions.
		C328.5	Assess different key management techniques and solutions for web security.
		C328.6	Analyze various case studies to identify the security vulnerabilities and prevention techniques.
C329	**ARTIFICIAL INTELLIGENCE AND NATURAL LANGUAGE PROCESSING LAB**	**C329.1**	Apply basic principles of AI in solutions that require problem solving, knowledge representation, and learning.
		C329.2	Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
		C329.3	Understand and carry out proper experimental methodology for training and evaluating

			empirical NLP systems
		C329.4	Design, implement, and analyze NLP algorithms
C32A	**DEVOPS LAB**	**C32A.1**	Identify components of Devops environment
		C32A.2	Different project management, integration, testing and code deployment tool
		C32A.3	Investigate different DevOps Software development, models
		C32A.4	Demonstrate continuous integration and development using Jenkins.
C32B	**INTERNET OF THINGS LAB**	**C32B.1**	Introduce the concept of M2M (machine to machine) with necessary protocols.
		C32B.2	Get the skill to program using python scripting language which is used in many IoT devices
		C32B.3	Get awareness in implementation of distance sensor
		C32B.4	Implement applications using Node MCU.
C32C	**DATA MINING LAB**	**C32C.1**	Apply preprocessing statistical methods for any given raw data.
		C32C.2	Gain practical experience of constructing a data warehouse.
		C32C.3	Implement various algorithms for data mining in order to discover interesting patterns from large amounts of data.
		C32C.4	Apply OLAP operations on data cube construction.
C32C	**SCRIPTING LANGUAGES LAB**	**C32C.1**	understand the differences between Scripting languages and programming languages
		C32C.2	Gain some fluency programming in Ruby
		C32C.3	Gain some fluency programming in Perl
		C32C.4	Gain some fluency programming in TCL
C32D	**MOBILE APPLICATION DEVELOPMENT LAB**	**C32D.1**	Understands the working of Android OS Practically.
		C32D.2	Develop user interfaces.
		C32D.3	Develop, deploy and maintain the Android Applications.
		C32D.4	Develop applications using database and to store information
C32E	**CRYPTOGRAPHY AND NETWORK SECURITY LAB**	**C32E.1**	Understand basic cryptographic algorithms, message and web authentication and security issues.
		C32E.2	Identify information system requirements for both of them such as client and server.
		C32E.3	Understand the current legal issues towards information security.
		C32E.4	Understand basic cryptographic algorithms for security issues.
C32F	**FUNDAMENTALS OF INTERNET OF THINGS**	**C32E.1**	Inference the impact and challenges posed by IoT networks leading to new architectural models.

		C32E.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
		C32E.3	Appraise the role of IoT protocols for efficient network communication.
		C32E.4	Elaborate python programming with various interfacing devices using with Raspberry PI.
		C32E.5	Construct a IoT application using Raspberry Pi, to handle data and perform analytics.
		C32E.6	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry
C32G	**RELIABILITY ENGINEERING**	**C32G.1**	Analyze reliability of various systems
		C32G.2	Model various systems applying reliability networks
		C32G.3	Evaluate the reliability of simple and complex systems
		C32G.4	Estimate the limiting state probabilities of repairable systems
		C32G.5	Apply various mathematical models for evaluating reliability of irreparable systems
		C32G.6	Interpret frequency and duration techniques for evaluation of systems
C32H	**RENEWABLE ENERGY SOURCES**	**C32H.1**	Assess the energy economics for conventional and renewable energy sources
		C32H.2	Understand the principles of wind and solar photovoltaic power generation , fuel cells
		C32H.3	Illustrate working principle and characteristics of Induction Generator
		C32H.4	Analyze various energy storage systems
		C32H.5	Understand the integration and interconnection of alternative energy sources with the grid
		C32H.6	Analyze the issues involved in the integration of non-renewable energy sources to the grid
C32I	**ENVIRONMENTAL SCIENCE (MC609)**	**C32I.1**	Discover knowledge regarding environment and its components.
		C32I.2	Understand the classification, importance and conservation of natural resources.
		C32I.3	Perceive the knowledge regarding different Bio - Geo classification of India.
		C32I.4	Examine impacts of pollution on the environment and their control measures.
		C32I.5	Analyze Environmental laws and Environmental Impact Assessments.
		C32I.6	Determine sustainable development that aims to meet raising human needs.

BVRIT HYDERABAD

College of Engineering for Women

Rajiv Gandhi Nagar, Bachupally, Hyderabad -90

Department of Information Technology

Course Outcomes for R22 Regulation I-Semester			
I Year I Sem			
Course Code	**Course Name**	**CO. No.**	**Course Outcomes**
C111	**MATRICES AND CALCULUS (MA101BS)**	**C111.1**	Solve the system of linear equations using various methods
		C111.2	Analyze the nature of quadratic form using eigen values and eigen vectors
		C111.3	Test the convergence or divergence of a given series
		C111.4	Derive infinite series expansions from mean value theorems
		C111.5	Evaluate multiple and improper integrals with some application
		C111.6	Optimize a given function with respect to given contrains
C112	**ENGINEERING CHEMISTRY (CH102BS)**	**C112.1**	Apply the knowledge of quantum mechanics to realize the dual nature of matter.
		C112.2	Discuss types of semiconducting materials and their characteristics.
		C112.3	Describe the importance of optoelectronic devices in Engineering.
		C112.4	Discuss types of lasers and their applications
		C112.5	Explain optical fibers and their significance in communication.
		C112.6	Make use of principles of magnetism and Dielectrics in modern technology.
C113	**Programming for Problem Solving(CS103ES)**	**C113.1**	Understand the basics of algorithms and flowcharts for solving problems.
		C113.2	Implement control structures in C programming language.
		C113.3	Apply the knowledge of derived data types & use of pre processor commands to solve problems.
		C113.4	Explore dynamic memory allocation and file handling functions using C.
		C113.5	Develop reusable code using concept of modular programming.
		C113.6	Demonstrate various searching and sorting techniques along with their time complexities.
C114	**Basic Electrical Engineering**	**C114.1**	Analyze DC electric circuits with basic electrical components.
		C114.2	Analyze single phase and three phase AC circuits.
		C114.3	Illustrate the performance of transformers.
		C114.4	Explain the construction of DC and AC machines
		C114.5	Explain the working Principle of DC and AC machine
		C114.6	Differentiate various components in electrical installations
C115	**COMPUTER AIDED ENGINEERING GRAPHICS (ME105ES)**	**C115.1**	Construct different types of non circular curves and scales used in various engineering applications.
		C115.2	Analyze the projections of points and lines.
		C115.3	Analyze the projections of planes and solids.

		C115.4	Apply different types of sectional planes to get the interior features of the objects by means of sectional views
		C115.5	Develop the surfaces to fabricate the objects.
		C115.6	Identify orthographic, Isometric projections and various CAD commands.
C116	**ELEMENTS OF Computer Science and Engineering**	**C116.1**	Understand the purpose of various components of a basic computer, significance of essentials in software development.
		C116.2	Understand the functionalities of various operating systems.
		C116.3	Understand the basics of organization and management of databases.
		C116.4	Understand the types of connectivity, applications and security issues, fundamentals of self - driven systems.
C117	**ENGINEERING CHEMISTRY LABORATORY (CH107BS)**	**C117.1**	Discover knowledge regarding environment and its components.
		C117.2	Understand the classification, importance and conservation of natural resources.
		C117.3	Perceive the knowledge regarding different Bio -Geo classification of India.
		C117.4	Examine impacts of pollution on the environment and their control measures.
		C117.5	Analyze Environmental laws and Environmental Impact Assessments.
		C117.6	Determine sustainable development that aims to meet raising human needs.
C118	**Programming for Problem Solving Laboratory**	**C118.1**	Build programs using control structures to solve simple mathematical problems.
		C118.2	Develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
		C118.3	Develop searching and sorting algorithms using C programs.
		C118.4	Build programs using control structures to solve simple mathematical problems.
Course Outcomes for R18 Regulation I-Semester			
II Year I Sem(R18)			
Course Code	**Course Name**	**CO. No.**	**Course Outcomes**
C211	**Analog and Digital Electronics (CS301ES)**	**C211.1**	Analyze the construction, principle of operation and characteristics of PN junction diode.
		C211.2	Differentiate various types of diodes and their applications.
		C211.3	Analyze the construction, principle of operation, characteristics and applications of BJT and FET.
		C211.4	Design biasing circuits to maintain stable operating point based on given specifications.
		C211.5	Realize logic circuits using diodes and transistors.
		C211.6	Design and analyze simple combinational and sequential circuits.
C212	**Data Structures (CS302PC)**	**C212.1**	Experiment with various operations on Stacks and queues.
		C212.2	Implement various operations on linear data structures and its applications.
		C212.3	Design programs using a variety of data structures like Hash Table Representation
		C212.4	Experiment with various operations on non linear data structures
		C212.5	Choose appropriate sorting technique for a given problem

		C212.6	Exploring Pattern matching algorithms and suffix Tries
C213	**Computer Oriented Statistical Methods (MA303BS)**	**C213.1**	Distinguish between discrete and continuous random variables
		C213.2	Analyze and interpret statistical data using appropriate probability distributions
		C213.3	Apply sampling distributions in real world problems
		C213.4	Estimate the value for a given parameter by choosing appropriate method
		C213.5	Apply suitable test to accept or reject a given hypothesis
		C213.6	Apply Stochastic process and Markov process to solve various problems
C214	**Computer Organization and Microprocessor (IT304PC)**	**C214.1**	Demonstrate the basic components and the structure of CPU, ALU and Control Unit
		C214.2	Categorize the instruction set, instruction formats and addressing modes of 8086
		C214.3	Develop assembly language programs to solve problems.
		C214.4	Assess Computer's arithmetic & Input – Output organization
		C214.5	Demonstrate memory hierarchy and its impact on cost/performance
		C214.6	Apply instruction level parallelism and pipelining for high performance Processor design
C215	**Object Oriented Programming using C++ (CS305PC)**	**C215.1**	Make use of object oriented paradigm with concepts of classes and objects.
		C215.2	Design and Implement programs using C++
		C215.3	Apply concepts of Inheritance in real time problems
		C215.4	Design solutions for real time problems using Polymorphism and Abstract classes.
		C215.5	Apply features of stream I/O, various file handling techniques in C++
		C215.6	Analyze the concept Exception handling using C++
C216	**Analog and Digital Electronics Lab (CS306ES)**	**C216.1**	Analyze the characteristics of Full wave rectifier.
		C216.2	Analyze the characteristics of different Transistor amplifier configurations.
		C216.3	Implement Boolean expressions using universal logic gates
		C216.4	Design and verify simple combinational and sequential circuits using IC s of different logic families.
C217	**Data Structures Lab (CS307PC)**	**C217.1**	Analyze the characteristics of different practical diodes and also different Transistor configurations
		C217.2	Design analog circuits for practical applications using Op Amp IC-741
		C217.3	Analyze the gain and bandwidth of different practical amplifier circuits.
		C217.4	Measure the frequency of different oscillator circuits.
C218	**IT Workshop and Microprocessor Lab (IT308PC)**	**C218.1**	Apply knowledge for computer assembling and software installation.
		C218.2	Estimate how to solve the trouble shooting problems.
		C218.3	Implement various operations on numbers using ALP
		C218.4	Use ALP to perform various String operations
C219	**C++ Programming Lab**	**C219.1**	Apply Object oriented features and C++ concepts.
		C219.2	Apply the concept of polymorphism and inheritance

	(CS309PC)	**C219.3**	Implement exception handling and templates
		C219.4	Develop applications using Console I/O and File I/O.
C21A	**Gender Sensitization Lab (*MC309)**	**C21A.1**	Develop a better understanding of important issues related to gender in contemporary India
		C21A.2	Analyze basic dimensions of the biological, sociological, psychological and legal aspects of gender
		C21A.3	Develop a sense of appreciation of women in all walks of life and will be equipped to work and live together as equals.
		C21A.4	Examine the new laws for women protection & relief, and empower students to understand and respond to gender violence
III Year I Sem(R18)			
C311	**Formal Languages & Automata Theory (CS501PC)**	**C311.1**	Design FA machines, minimization, achieve conversions among them.
		C311.2	Construct Regular expressions and Test for regular languages
		C311.3	Analyze LMD,RMD derivations and convert grammar to finite automata and vice versa
		C311.4	Design Pushdown Automata and normal forms for context free grammars.
		C311.5	Design appropriate Turing Machine for a given problem
		C311.6	Distinguish P,NP problems and PCP problems
C312	**Software Engineering (CS502PC)**	**C312.1**	Illustrate software process framework and models for the development of software application
		C312.2	Analyze and validate the requirement engineering strategy for developing software requirement specification document
		C312.3	Choose appropriate model to create an architectural design
		C312.4	Apply various testing strategy to verify the software quality
		C312.5	Illustrate the importance of framework for product metrics
		C312.6	Identify the risk strategy and QA techniques for developing quality software
C313	**Data Communication & Computer Networks (IT503PC)**	**C313.1**	Analyze functionality of each layer is the ISO-OSI Reference Model, with suitable examples
		C313.2	Determine the pros and cons of various Transmission media and their usage in real time network implementation.
		C313.3	Analyze various error control, flow control, access control mechanisms for effective implementation of networking.
		C313.4	Estimate suitable routing algorithm for various network topologies and assess different addressing mechanisms
		C313.5	Assess the connection management and congestion control of TCP protocol.
		C313.6	Analyze the features and operations of various user interface protocols.
C314	**Web Programming (IT504PC)**	**C314.1**	Design webpage using HTML,CSS, JavaScript
		C314.2	Analyze the concepts of core java in application development.
		C314.3	Develop java application in communicating with database server.
		C314.4	Develop standalone application using AWT and Applets.
		C314.5	Develop web based application using the server side technologies like servlet and JSP.

		C314.6	Analyze the purpose of XML in web services.
C315	**Biometrics (IT511PE)**	**C315.1**	Identify the various Biometric technologies and apply the knowledge for designing biometric systems.
		C315.2	Identify pattern recognition system and its features.
		C315.3	Analyze the principles of the core biometric modalities (face, fingerprint, retina and iris), and to deploy them in authentication scenarios.
		C315.4	Examine the privacy and security concerns surrounding biometric systems.
		C315.5	Develop Watermarking techniques of biometrics.
		C315.6	Assess the need of biometric in the society and understand the research on biometric techniques.
C316	**Advanced Computer Architecture (CS512PE)**	**C316.1**	Identify different computational models and Computer Architectures.
		C316.2	Analyze operation of parallel processing and memory hierarchy and the range of performance issues influencing its design.
		C316.3	Classify the performance of different pipelined &non- pipelined processors.
		C316.4	Analyze architectural features of advanced processors like Superscalar processors, multiprocessors.
		C316.5	Analyze multiprocessors & thread level parallelism using shared, distributed memory models.
		C316.6	Develop the design techniques of Scalable and multithreaded Architecture.
C317	**Data Analytics (CS513PE)**	**C317.1**	Fetch data from various sources and make it ready for analysis
		C317.2	Make use of various tools and technologies for data analysis
		C317.3	Apply regression techniques to data and evaluate performance
		C317.4	build supervised and unsupervised learning models for object segmentation
		C317.5	Build models for time series and evaluate performance
		C317.6	Visualize the data and interpret the insights exist in data
C318	**Image Processing (CS514PE)**	**C318.1**	Demonstrate the knowledge of the basic concepts of the two-dimensional signal acquisition, sampling and quantization and its applications of Image Processing
		C318.2	Analyze the image enhancement using model of spatial and frequency filtering technique
		C318.3	Demonstrate the knowledge of 2Dimensional transformation techniques.
		C318.4	Implement the image enhancement, segmentation, restoration, and compression techniques and problems.
		C318.5	Examining the Image processing algorithms by Open Source / Image Processing Tools / Matlab Software
		C318.6	Professional Contribution in the field of Digital Image Processing
C319	**Principles of Programming Languages (CS515PE)**	**C319.1**	Identify the building blocks of various Programming languages
		C319.2	Implement various methods to describe syntax and semantics of programming languages
		C319.3	Examine fundamentals like Data types, Control Structures etc. of various programming languages.
		C319.4	Make use of Subprograms and ADT in implementing business logic.

		C319.5	Apply the techniques to handle Concurrency, Exceptions and Events in programming.
		C319.6	Outline Functional, Logic and Scripting Programming Language Concept
C31A	**Computer Graphics (CS521PE)**	**C31A.1**	Analyze the functionality of various Input ,output devices
		C31A.2	Design algorithms for primitive components and to fill 2-D shapes
		C31A.3	Perform transformations and create views for 2-D co-ordinates
		C31A.4	Perform transformations and create views for 3-D co-ordinates
		C31A.5	Apply surface detection methods
		C31A.6	Build interactive computer animations
C31A	**Database Security (IT521PE)**	**C31B.1**	Evaluate various security models for large and distributed database systems
		C31B.2	Illustrate various security mechanisms for databases
		C31B.3	Relate security aspects with respect to software design and development
		C31B.4	Demonstrate database protection and intrusion detection system
		C31B.5	Compare various models for the protection of new generation database systems
		C31B.6	Apply security aspects in design of system and projects.
C31B	**Advanced Operating Systems (CS522PE)**	**C31C.1**	Draw inference on the various design approaches of advanced operating systems
		C31C.2	Analyze the design issues of distributed operating systems.
		C31C.3	Inspect and Identify the e advantages and challenges in designing distributed algorithms for different primitives like mutual exclusion, deadlock detection, agreement, etc.
		C31C.4	Examine design issues and computational performance of multi-processor operating systems.
		C31C.5	Identify the requirements of Distributed File System and Distributed Shared Memory.
		C31C.6	Analyze how computing power is created and synchronized in Distributed systems
C31C	**Machine Learning (IT523PE)**	**C31D.1**	Formulate machine learning problems corresponding to different applications
		C31D.2	Analyze Decision Tree Algorithm and Back propagation algorithms
		C31D.3	Evaluate the various error estimation and weight tuning rules.
		C31D.4	Examine Expectation Minimization and Hidden Markov Models
		C31D.5	Survey the instance based learning mechanisms.
		C31D.6	Apply genetic Learning algorithmic approach for search and optimization problem.
C31D	**Pattern Recognition (IT524PE)**	**C31E.1**	Analyze structural pattern recognition and feature extraction techniques
		C31E.2	Classify patterns using Nearest neighbour and Naives Bayes classifier.
		C31E.3	Apply theoretical foundations of decision trees to identify best split and Bayesian classifier to label data points.
		C31E.4	Identify the state sequence and evaluate a sequence emission probability from a given HMM.
		C31E.5	Illustrate the working of classifier models like SVM, Neural Networks and identify the appropriate classifier model for typical machine learning applications.
		C31E.6	Illustrate and apply clustering algorithms and identify its applicability in

			real life problems in digit recognition
C31F	**Software Engineering Lab (CS505PC)**	**C31F.1**	Analyze the problem and identify project scope and objectives and analyze the software requirements and prepare SRS document.
		C31F.2	Develop risk strategy and QA techniques for developing quality software
		C31F.3	Design the software using UML diagrams
		C31F.4	Design the test case document
C31G	**Computer Networks & Web Programming Lab (IT506PC)**	**C31G.1**	Implement various suitable protocols from Data link layer to Application layer with reference to OSI Model.
		C31G.2	Evaluate data transmission protocols and monitor the network traffic using appropriate tools.
		C31G.3	Develop web applications using Client Side Technologies HTML, CSS, Javascript and XML
		C31G.4	Develop web applications using Server Side Technologies PHP, Servlet and JSP
C31H	**Advanced Communication Skills Lab (EN508HS)**	**C31H.1**	Build sound vocabulary and its proper use contextually.
		C31H.2	Make use of functional English effectively in formal and informal contexts.
		C31H.3	Develop effective speaking skills and Maximize job prospects.
		C31H.4	Plan and make different forms of presentation using various techniques.
C31I	**Intellectual Property Rights (*MC510)**	**C31I.1**	Explore different types of intellectual properties (IPs) and their roles in contributing to organizational competitiveness
		C31I.2	Demonstrate Crucial role of IP in organizations of different Industrial sectors for the purposes development
		C31I.3	Contrast the Crucial role of IP for the purposes Publishing, Copy Right etc.
		C31I.4	Illustration of IP in organizations of different Industrial sectors for Trade Secret, and Implementing
		C31I.5	Evaluation of IP in Industrial sectors for obtaining and maintaining Trade Mark law and International Trade Mark Law
		C31I.6	Interpretation of different levels of Infringement
IV Year I Sem(R18)			
C411	**Information security (IT701PC)**	**C411.1**	Illustrate the concepts and principles of security Attacks, Services and Mechanisms.
		C411.2	Evaluate applications of Cryptographic algorithms in real time scenarios.
		C411.3	Demonstrate the techniques like Message authentication, Hash function and Public key encryption.
		C411.4	Exemplify different key management techniques and solutions for web security.
		C411.5	Solve the network security issues using available security solutions.
		C411.6	Evaluate the role played by various security mechanisms like passwords, access control mechanisms, firewalls etc.
C412	**Data Mining (CS702PC)**	**C412.1**	Examine data mining tasks, KDD process and challenges.
		C412.2	Apply Data Preprocessing techniques to make data sets ready to be mining.
		C412.3	Identify the frequent patterns and association rules from transactional datasets.
		C412.4	Classify the real world data into appropriate classes using various supervised learning techniques and measure its performance.
		C412.5	Examine data mining tasks, KDD process and challenges.

		C412.6	Apply Data Preprocessing techniques to make data sets ready to be mining.
C413	**Web security (IT711PE)**	**C413.1**	Explore the importance of cryptography & other techniques in web security
		C413.2	Analyze the techniques of privacy protecting backups and anti-theft in web security perspective
		C413.3	Identify the role of Access Control model for Database issues in Trust management &Truest Negotiation
		C413.4	Examine Various issues in Data warehouses and OLAP System
		C413.5	Illustrate the need of security Re-engineering for Databases
		C413.6	Explore future trends in privacy & Security polices in mobile enrolment
C414	**High performance computing (IT712PE)**	**C414.1**	Study various computing technology architecture.
		C414.2	Setting up the cluster-Security-System Monitoring
		C414.3	Get the knowledge on cloud computing service models.
		C414.4	Exploring emerging trends in computing technology.
		C414.5	Understand big data and hadoop architecture.
		C414.6	Deploying computing technology.
C415	**Artificial Intelligence (CS713PE)**	**C415.1**	Understand the performance of conventional vehicles by mathematical models.
		C415.2	Illustrate the importance of hybrid and electric vehicles to safeguard environment
		C415.3	Analyze power flow of hybrid electric drive trains by various topologies
		C415.4	Evaluate the energy storage technology by sizing various sub systems
		C415.5	Analyze Performance of DC and AC drives
		C415.6	Understand energy management strategies of hybrid and battery electric vehicles
C416	**Cloud Computing (CS714PE)**	**C416.1**	Understand various types of computing paradigms.
		C416.2	Identify the need for Cloud Computing and its essential characteristics.
		C416.3	Analyze Cloud architecture, network connectivity and its Applications
		C416.4	Analyze management in Cloud infrastructure and approaches of Cloud migration
		C416.5	Identify Cloud environment using Infrastructure as a Service (IaaS) , PaaS and SaaS
		C416.6	Analyze Cloud era by different platforms
C417	**Adhoc & Sensor network (CS715PE)**	**C417.1**	Identify the importance of MANETS in ASN
		C417.2	Explore Routing & forwarding strategies in ASN
		C417.3	Compare various data transmission techniques like Broadcasting &multicasting
		C417.4	Analyze the role of Geo casting in ASN
		C417.5	Illustrate the applications of wireless sensors
		C417.6	Examine various Lower layer Issues and Higher layer issues of wireless sensor networks
C418	**Intrusion Detection Systems**	**C418.1**	Examine Various threats against computes and networked system
		C418.2	Explore various classes of attacks in network layer

	(IT721PE)	**C418.3**	Identify various solutions for the problem Intrusion deletion System
		C418.4	Make use of Anomaly directors and algorithms for intrusion Detection
		C418.5	Examine various techniques like malware detection-obfuscation foe attack trees and correction of alerts
		C418.6	Utilize different techniques to resolve email security issues
C419	**Real Time Systems (CS722PE)**	**C419.1**	Apply the commands for file I/O and process Control
		C419.2	Implement time management & task management in the real time operating systems
		C419.3	Analyze the communication among processes during concurrency
		C419.4	Configure different components of I/O
		C419.5	Handle Exceptions & Interrupts
		C419.6	Distinguish functionalities of various real time operating systems namely RT Linux,Vx Works,MicroC/OS-II, Tiny OS and Embedded Linux
C41A	**Soft Computing (CS723PE)**	**C41A.1**	Identify the difference between hard and soft computing
		C41A.2	Understand fuzzy logic and reasoning to handle and solve engineering problems
		C41A.3	Identify the difference between problem solving and decision making
		C41A.4	Implement the particle swarm optimizations for various applications
		C41A.5	Perform various operations of genetic algorithms, Rough Sets.
		C41A.6	Create various models to integrate soft computing techniques
C41B	**Distributed Databases (IT724PE)**	**C41B.1**	Classify the various distributed systems, challenges and models.
		C41B.2	Evaluate the importance of clock, process synchronization and debugging of distributed systems.
		C41B.3	Examine the protocol for inter process communication and distributed objects.
		C41B.4	Explore distributed file system, naming services and shared memory for distributed systems.
		C41B.5	Categorize the distinct transactions mechanism and locks.
		C41B.6	Inspect concurrency control and recovery mechanisms for distributed systems.
C41C	**Software Process & Project Management (CS725PE)**	**C41C.1**	Analyze the Software process maturity levels for Process Improvement and Process Assessment
		C41C.2	Explore the Software Management Renaissance in Economics
		C41C.3	Evaluate Life cycle phases and Artifacts in Project Management
		C41C.4	Examine the role of workflows and checkpoints in process planning
		C41C.5	Illustrate the importance of Project Organization, Project
		C41C.6	Control and process instrumentation in Project management
C41D	**Electronic Sensors**	**C41D.1**	Illustrate the characteristics and operating principles of Sensors
		C41D.2	Summarize the construction and operation of various Electro Mechanical Sensors.
		C41D.3	Analyze the working principles and applications of different Thermal Sensors
		C41D.4	Explore the working principles of different Magnetic Sensors

		C41D.5	Utilize Radiation and Electro Analytical Sensors to compute radiation and various electrical parameters.
		C41D.6	Make use of smart sensors to measure different physical parameters and apply them in various Fields
C41E	**Information security lab (IT703PC)**	**C41B.1**	Experiment with various cryptographic techniques to encode and decode the given text.
		C41B.2	Develop solutions using symmetric key algorithms.
		C41B.3	Build solutions using public key cryptographic algorithms.
		C41B.4	Apply various secure hash algorithms to generate hash key.
C41F	**Industrial Oriented Mini Project/ Summer Internship (IT704PC)**	**C41F.1**	Utilize acquired knowledge within the chosen area of technology for project development
		C41F.2	Justify the technical aspects of the chosen project with a comprehensive and systematic approach
		C41F.3	Develop engineering projects using technical aspects
		C41F.4	Construct the report of project related activities effectively to peers and mentors
C41G	**Seminar (IT705PC)**	**C41G.1**	Identify emerging topic specific to the programme.
		C41G.2	Extract the information relevant to the chosen topic.
		C41G.3	Deliver the knowledge using multimedia.
		C41G.4	Answer the queries with appropriate explanation and elaboration.
		C41G.5	Compile an effective technical report, providing conclusions and proposing an appropriate future scope.
C41H	**Project stage-I (IT706PC)**	**C41H.1**	Identify problem, conduct literature survey and formalize it.
		C41H.2	Analyze and propose an efficient, cost-effective and eco-friendly solution using relevant tools and technologies.
		C41H.3	Finalize the design plan and implement at least one module of the project.
		C41H.4	Demonstrate effective communication and report writing skills.
		C41H.5	Recognize the need for team work and exhibit professional ethics.

Course Outcomes for R22 Regulation II-Semester			
I Year II Sem			
C121	**ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (MA201BS)**	**C121.1**	Solve geometrical and physical problems using first order and first degree differential equation.
		C121.2	Solve higher order linear differential equations with constant coefficients
		C121.3	Evaluate double and triple integrals
		C121.4	Estimate area, volume, center of mass and gravity using multiple integration
		C121.5	Analyze the properties of Differential Operators
		C121.6	Evaluate the line, surface, and volume integrals using their inter-relationships
C122	**APPLIED PHYSICS (PH202BS)**	**C122.1**	Understand the basic electronic modifications that reflect on properties of materials for advance design of materials.
		C122.2	Analyze the basic properties of water and its usage in domestic and industrial purposes.
		C122.3	Inspect the working principles of electrochemical systems for the production of various energy storage devices.
		C122.4	Analyze engineering problems related corrosion, metal finishing and use of appropriate design criteria in achieving a practical solution.
		C122.5	Design the materials that impact the natural and technological environments with the knowledge of stereochemistry.
		C122.6	Evaluate the materials behavior at microscale by spectroscopy which determines the development of materials for many real-world applications.
C123	**ENGINEERING WORKSHOP (ME203ES)**	**C123.1**	Analyze DC electric circuits with basic electrical components.
		C123.2	Analyze single phase and three phase AC circuits.
		C123.3	Analyze different types of Transformers
		C123.4	Understand the working of different rotating machines
		C123.5	Assess the performance of different rotating machines
		C123.6	Classify the components of Low Voltage Electrical Installations.
C124	**ENGLISH FOR SKILL ENHANCEMENT (EN204HS)**	**C124.1**	Discuss on manufacturing of components using various trades like fitting, carpentry, welding and Black-smithy.
		C124.2	Develop house hold and engineering goods from metallic sheets in tin smithy.
		C124.3	Apply basic electrical engineering knowledge for house wiring practice.
		C124.4	Prepare a sand mould for a given pattern using foundry tools.
C125	**ELECTRONIC DEVICES AND CIRCUITS (EC205ES)**	**C125.1**	Analyze the characteristics of PN junction diode.
		C125.2	Construct diode circuits for various applications.
		C125.3	Illustrate the transistor working in different configurations.
		C125.4	Differentiate between FET and BJT devices.
		C125.5	Illustrate the operation and characteristics of special purpose diodes.
		C125.6	Use diode and transistor as switches in electronic circuits.

C126	**PYTHON PROGRAMMING LABORATORY (CS206ES)**	**C126.1**	Build basic programs using fundamental programming constructs.
		C126.2	Explore Strings, Lists, Tuples and Dictionaries in Python
		C126.3	Develop reusable code and GUI application using standard Library
		C126.4	Implement File I/O and Digital Logic Gates using Python
C127	**APPLIED PHYSICS LABORATORY (PH207BS)**	**C127.1**	Estimate the work function of metal using Photoelectric effect and identify the type of semiconductor material whether it is n-type or p-type by Hall effect.
		C127.2	Determine energy gap and resistivity of semiconductors and draw the characteristics of semiconductor and optoelectronic devices.
		C127.3	Understand the electrical and magnetic properties of materials.
		C127.4	Demonstrate the working principle of lasers and optical fibers.
C128	**ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY (EN208HS)**	**C128.1**	Understand nuances of English language through audio-visual experience
		C128.2	Write professional documents such as letters, reports and projects.
		C128.3	Use neutralized accent for intelligibility
		C128.4	Demonstrate production skills during interviews,presentations, collaborative projects.
C129	**IT WORKSHOP (CS209ES)**	**C129.1**	Understand Hardware components and inter dependencies
		C129.2	Safeguard computer systems from viruses/worms
		C129.3	Preparations of Documents and Interactive presentations
		C129.4	Perform calculations using spreadsheets
Course Outcomes for R18 Regulation I-Semester			
II Year II Sem(R18)			
C221	**Discrete Mathematics (CS401PC)**	**C221.1**	Apply mathematical logic to prove reason and infer various compound statements.
		C221.2	Model the mathematical problems using sets, functions and relations.
		C221.3	Prove mathematical results using various forms of Induction techniques.
		C221.4	Solve the counting problems on finite and discrete structures.
		C221.5	Solve the recursive functions by converting into recurrence relations.
		C221.6	Construct graphs to solve appropriate real-world problems.
C222	**Business Economics & Financial Analysis (SM402MS)**	**C222.1**	Understand the Economic Concepts in business decision making process.
		C222.2	Familiarize with the cost concepts, market structures.
		C222.3	Make use of breakeven analysis, CVP Analysis, pricing strategies.
		C222.4	Examine financial accounting and analyze various financial statements.
		C222.5	Interpret various financial statements by applying different types of ratios.
		C222.6	Examine the usefulness of funds flow statement and cash flow statement for better managerial decisions.
C223	**Operating Systems (CS403PC)**	**C223.1**	Analyze the functionalities and structure of a generic Operating System.

		C223.2	Evaluate various CPU scheduling algorithms
		C223.3	Analyze Process Synchronization and IPC mechanisms.
		C223.4	Assess the techniques of deadlock avoidance and prevention
		C223.5	Examine various Memory management techniques
		C223.6	Explore file system interface & its Operations
C224	**Database Management Systems (CS404PC)**	**C224.1**	Identify and classify the components of Database system
		C224.2	Model the data using ER model and convert into Relational Model
		C224.3	Access and manipulate the data in the databases
		C224.4	Refine the database schema to improve data consistency
		C224.5	Ensure the properties of transactions on databases
		C224.6	Examine different file organizations and indexing methods.
C225	**Java Programming (CS405PC)**	**C225.1**	Illustrate Object Oriented concepts and basics of java programming
		C225.2	Make use of the concepts of packages and Interfaces
		C225.3	Implement the concepts of multithreading and /or handle run time errors for Java applications
		C225.4	Utilize collection framework and /or file management in Java applications
		C225.5	Design real time applications using event handling concepts.
		C225.6	Develop real time GUI applications using applet, AWT, JDBC and swings
C226	**Operating Systems Lab (CS406PC)**	**C226.1**	Evaluate CPU Scheduling algorithms and memory management techniques.
		C226.2	Construct deadlock detection and avoidance algorithms.
		C226.3	Solve classical problems of synchronization using Semaphores
		C226.4	Evaluate inter process communication mechanisms using system calls and pipes.
C227	**Database Management Systems Lab (CS407PC)**	**C227.1**	Design conceptual model (E-R model) for the given database.
		C227.2	Formulate the queries using DML, DDL, DCL commands.
		C227.3	Enforce integrity constraints on databases.
		C227.4	Implement triggers, stored procedures and cursors.
C228	**Java Programming Lab (CS408PC)**	**C228.1**	Make use of JDK, Eclipse platform for developing java programs.
		C228.2	Build programs using abstract classes and multithreading concepts.

		C228.3	Develop programs using GUI components.
		C228.4	Develop Programs using Quick Sort and Bubble Sort.
C229	**Constitution of India (*MC409)**	**C229.1**	Understand the historical perspective of Constitution of India
		C229.2	Analyze the features and Characteristics of Constitution of India
		C229.3	Understand the concepts of Fundamental Rights and Duties of Indian Citizens.
		C229.4	Examine The Directive Principles of State Policy
		C229.5	Understand the Parliamentary form of Government in India
		C229.6	Examine the emergency provisions: National Emergency, President Rule and Financial Emergency.
III Year II Sem(R18)			
C321	**Introduction to Embedded Systems (IT601PC)**	**C321.1**	Distinguish the embedded systems from general purpose processing systems.
		C321.2	Recommend suitable hardware for different applications of embedded systems.
		C321.3	Select different types and amount of memory based on embedded system specifications.
		C321.4	Discuss the Embedded firmware design approaches, development languages and device drivers
		C321.5	Analyze the issues and techniques of Task synchronization and communication in embedded firmware.
		C321.6	Differentiate between general purpose operating systems and RTOS.
C322	**Principles of Compiler Construction (IT602PC)**	**C322.1**	Identify the phases in design of a compiler
		C322.2	Apply practical aspects of automata theory
		C322.3	Distinguish between top-down parsers and bottom-up parsers.
		C322.4	Construct Intermediate Code based on Abstract Tree and Symbol table data.
		C322.5	Decide among the code optimizati7on techniques to use.
		C322.6	Build powerful code generating compilers.
C323	**Algorithm Design and Analysis (IT603PC)**	**C323.1**	Analyze the performance of algorithms and represent using relevant notations.
		C323.2	Model various engineering problems using graphs and trees.
		C323.3	Apply suitable paradigm to design efficient algorithms for wide-range of problems.
		C323.4	Reduce the search space of a problem using bounding functions.
		C323.5	Choose an appropriate data structure for the design.
		C323.6	Identify P, NP, NP-Hard and NP-Complete problems to apply suitable techniques.
C324	**Internet of Things (IT604PC)**	**C324.1**	Inference the impact and challenges posed by IoT networks leading to new architectural models.

		C324.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
		C324.3	Appraise the role of IoT protocols for efficient network communication.
		C324.4	Elaborate python programming with various interfacing devices using with Raspberry PI.
		C324.5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry
		C324.6	Construct a restful web API.
C325	**Ethical Hacking (IT611PE)**	**C325.1**	Able to gain the over view of ethical hacking
		C325.2	Gain the knowledge of the use and availability of tools to support an ethical hack
		C325.3	Gain the knowledge of interpreting the results of a controlled attack
		C325.4	Understand the role of politics, inherent and imposed limitations and metrics for planning of a test
		C325.5	Able to capture passwords using password crackers
		C325.6	Comprehend the dangers associated with penetration testing
C326	**Network Programming (CS612PE)**	**C326.1**	Examine major protocols used for inter process communication
		C326.2	Analyzing Client server communication, Elementary UDP Sockets programming, I/o multiplexing
		C326.3	Apply the concepts related to Interprocess communication using sockets.
		C326.4	Explain network services that communicate through Internet
		C326.5	Access various kinds of Broadcasting and Multicasting mechanisms.
		C326.6	Design robust socket-based applications
C327	**Scripting Languages (CS613PE)**	**C327.1**	Make use of resources to gain some fluency programming in Ruby, Perl, TCL and TK
		C327.2	Analyze the features of Ruby by embedding in different ways
		C327.3	Understanding the Perl by utilizing the advanced features
		C327.4	Explain syntax, variables and various features of TCL
		C327.5	Elaborate strengths and weakness TCL and select an appropriate language for solving a given problem
		C327.6	Examine the TK by embedding in different ways
C328	**Mobile Application Development (CS614PE)**	**C328.1**	Analyze the features, components and life cycle of Android Operating system
		C328.2	Design Android application with UI components, Fragments and event handling
		C328.3	Identify the importance of intents in Android applications development
		C328.4	Develop Android applications using broadcasts and notifications
		C328.5	Examine the data persistence mechanism using Files and Shared Preferences
		C328.6	Develop Android application to perform operations with SQLite database
C329	**Software Testing Methodologies (CS615PE)**	**C329.1**	Analyze the basic concepts of software testing and its essentials and Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.

		C329.2	Apply functional testing using control flow and transaction flow graphs.
		C329.3	Test for a domain or an application and identifying the nice and ugly domains.
		C329.4	Choose appropriate path expression, KV charts, specifications and more testing strategies.
		C329.5	Design and implement state graph, state testing, good state graph, bad state graph and their testability tips.
		C329.6	Explain graph matrices, matrix properties and node reduction algorithm.
C32A	**Open Elective-I (Renewable Energy Sources)**	**C32A.1**	Understand the need of energy conversion and the various methods of energy storage
		C32A.2	Explore the field applications of solar energy
		C32A.3	Identify Winds energy as alternate form of energy and to know how it can be tapped
		C32A.4	Understand bio gas generation and its impact on environment
		C32A.5	Understand the Geothermal &Tidal energy, its mechanism of production and its applications
		C32A.6	Illustrate the concepts of Direct Energy Conversion systems & their applications.
C32B	**Embedded Systems & Internet of Things Lab (IT605PC)**	**C32B.1**	Exploring the Functional testing of devices and Exporting Display on to other systems
		C32B.2	Evaluate the interface of I/O devices and GPIO programming
		C32B.3	Make use of IOT components to Evaluate the functionality of Voltage indicator, Game simulation and Display interfaces
		C32B.4	Examining the functionality of tools used for porting, website hosting and FM transmission
C32C	**Compiler Construction Lab (IT606PC)**	**C32C.1**	Identify the practical approach of how a compiler works
		C32C.2	Construct top down and bottom up parse tools
		C32C.3	Construct LEX and YACC programs
		C32C.4	Develop new computer languages
C32D	**Ethical Hacking Lab (IT621PE)**	**C32D.1**	Gain the knowledge of the use and availability of tools to support an ethical hack
		C32D.2	Gain the knowledge of interpreting the results of a controlled attack
		C32D.3	Able to capture web based passwords
		C32D.4	Able to create penetration testing
C32E	**Network Programming Lab (CS622PE)**	**C32E.1**	Develop inter process communication using pipes, message queue & shared memory
		C32E.2	Design and implement client-server applications using TCP and UDP sockets
		C32E.3	Implement peer to peer communication
		C32E.4	Analyze Network programs
C32F	**Scripting Languages Lab(CS623PE)**	**C32F.1**	Understanding the Ruby by utilizing the advanced features
		C32F.2	Understanding the Perl by utilizing the advanced features
		C32F.3	Understanding the TCL by utilizing the advanced features
		C32F.4	Elaborate strengths and weakness TCL and select an appropriate language for solving a given problem
C32G	**Mobile Application**	**C32G.1**	Design Android User Interface using Layouts and components

	Development Lab (CS624PE)	**C32G.2**	Design android applications using menus, notifications and files
		C32G.3	Develop Android application to persist data in Files, Shared Preferences and SQLite databases
		C32G.4	Develop Android application based on Alarm and URL
C32H	**Software Testing Methodologies Lab (CS625PE)**	**C32H.1**	Examine selenium tool to perform functional testing
		C32H.2	Demonstrate how to execute test scripts using selenium
		C32H.3	Apply advanced features of Selenium to automate the use cases
		C32H.4	Build test scripts on automation of web based and windows-based applications
C32I	**Environmental Science(*MC609)**	**C32I.1**	Discover knowledge regarding environment and its components.
		C32I.2	Understand the classification, importance and conservation of natural resources.
		C32I.3	Perceive the knowledge regarding different Bio -Geo classification of India.
		C32I.4	Examine impacts of pollution on the environment and their control measures.
IV Year II Sem			
C421	**Organizational Behavior(SM801MS)**	**C421.1**	Analyze the behavior of individuals and groups in Organizations
		C421.2	Analyze the factors that influence Organizational Behavior
		C421.3	Examine the potential effects of organizational level factors on organizational behavior.
		C421.4	Analyze potential effects of important developments in the external environment on Organizational behavior.
		C421.5	Examine the role of globalization and advances in technology on Organizational behavior.
		C421.6	Analyze organizational behavior theories, models and concepts.
C422	**Natural language Processing(IT811PE)**	**C422.1**	Outline the sensitivity to linguistic phenomena and ability to model using syntax, semantics and pragmatics with formal grammars.
		C422.2	Students will able to understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
		C422.3	Manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods with ambiguity resolution.
		C422.4	Design, implement, and analyze NLP algorithms for a given Natural Language tasks.
		C422.5	Design different language Modeling Techniques using AI and ML algorithms.
		C422.6	Design Applications of Natural Language Processing using open source / Python / NLTK and Natural Language Tools.
C423	**Distributed Systems (CS812PE)**	**C423.1**	Classify the various distributed systems, challenges and models.
		C423.2	Evaluate the importance of clock, process synchronization and debugging of distributed systems.
		C423.3	Examine the protocol for inter process communication and distributed objects.
		C423.4	Explore distributed file system, naming services and shared memory

			for distributed systems.
		C423.5	Categorize the distinct transactions mechanism and locks.
		C423.6	Inspect concurrency control and recovery mechanisms for distributed systems.
C424	**Neural Networks & Deep Learning (CS813PE)**	**C424.1**	Ability to understand the concepts of Neural Networks
		C424.2	Ability to select the Learning Networks in modeling real world systems
		C424.3	Ability to understand deep learning architectures
		C424.4	Ability to use an efficient algorithm for Deep Models
		C424.5	Ability to use Regularizations for deep learning
		C424.6	Ability to apply optimization strategies for large scale Applications
C425	**Human Computer Interaction (CS814PE)**	**C425.1**	Elaborate the design of good Interface and features of GUI
		C425.2	Compare the Human interaction speed with computers
		C425.3	Apply visually pleasing composition of elements on screen design
		C425.4	Identify Various Navigation Schemes, Screen based controls in user interface design
		C425.5	Design effective HCI for individuals
		C425.6	Ability to design certain tools for blind or PH people.
C426	**Cyber Forensics (CS815PE)**	**C426.1**	Understand the fundamentals of Cyber Crime
		C426.2	Analyze the nature and effect of cybercrime in society.
		C426.3	Demonstrate Accounting Forensics.
		C426.4	Analyze Computer Crime and Criminals and Liturgical Procedures.
		C426.5	Apply the laws and regulations to the applications
		C426.6	Analyze the email tracking cyber applications.
C427	**Basic power plant Engineering**	**C427.1**	Understand the components and layouts of various power plants.
		C427.2	Analyze Rankine Cycle in coal based power plants and Brayton Cycle in Gas turbine power plants
		C427.3	Elucidate various nuclear reactors
		C427.4	Discuss the principles of various non conventional energy power plants
		C427.5	Examine the economic aspects for electrical power generation
		C427.6	Apply various pollution control techniques in power plants
C428	**Project Stage – II (IT802PC)**	**C428.1**	Implement the remaining modules or features of the project complying with timelines.
		C428.2	Demonstrate the functionality of the project and evaluate the results.
		C428.3	Derive the conclusion to provide scope for future enhancement.
		C428.4	Integrate the findings of Stage-I & Stage-II and prepare a comprehensive report.
		C428.5	Exhibit technical, interpersonal and leadership skills with individual contribution.

BVRIT HYDERABAD

College of Engineering for Women
Rajiv Gandhi Nagar, Bachupally, Hyderabad -90
Department of Information Technology
MTech (Data Sciences)

Course Outcomes for R22 Regulation I-Semester			
I Year I Semester			
Course Code	**Course Name**	**CO. No.**	**Course Outcomes**
C101	**AdvancedDataStructures UsingPython**	**C101.1**	Understand basic concepts of scripting with all Python syntax and semantics
		C101.2	Understand data structures like Lists, Dictionaries and Regular expressions in Python
		C101.3	Implement all searching and sorting techniques using python
		C101.4	Apply different data structures to solve real world problem
		C101.5	Interpret the concepts of Object-Oriented Programming as used in python
		C101.6	Develop python application using objects and classes
C102	**Statistical Foundations For Data Science**	**C102.1**	Examine various theorems, algorithms in arithmetic for GCD and factorization
		C102.2	Analyze the techniques of regression and correlation
		C102.3	Justify the importance of discrete probability distributions in data science
		C102.4	Compare various continuous probability distribution techniques
		C102.5	Inspect the methods of Estimation and tests of hypotheses.
		C102.6	Distinguish between Stochastic Processes and Markov Chains in data analysis
C111	**Image and Video Processing (Professional Elective-I)**	**C111.1**	Understand theory and models in Image and Video Processing.
		C111.2	Explain the need of spatial and frequency domain techniques for image compression.
		C111.3	Comprehend different methods, models for video processing and motion estimation.
		C111.4	Illustrate quantitative models of image and video segmentation.
		C111.5	Apply image segmentation techniques to identify and extract meaningful objects or regions in images.
		C111.6	Apply feature extraction methods, including boundary pre-processing, region and boundary feature descriptors for image analysis and recognition tasks.
C112	**Advanced Databases (Professional Elective-I)**	**C112.1**	Understand Database system Architectures and parallel databases.
		C112.2	Analyze transactions, Concurrency Control in Distributed Databases.

		C112.3	Understand the importance of Data Warehousing and Mining.
		C112.4	Compare different approaches of data warehousing and data mining with various technologies.
		C112.5	Illustrate concepts of object-based databases.
		C112.6	Understand the advance databases.
C113	**Data Wrangling and Visualization (Professional Elective-I)**	**C113.1**	Create data from various data repositories.
		C113.2	Perform data wrangling
		C113.3	Explain principles of visual perception
		C113.4	Apply core skills for visual analysis
		C113.5	Apply visualization techniques for various data analysis tasks
		C113.6	Evaluate visualization techniques
C121	**Ad-Hoc And Sensor Networks (Professional Elective-II)**	**C121.1**	Understand the challenges of MANETs and routing in MANETs in ad hoc and wireless sensor networks (ASN)
		C121.2	To understand the MAC and transport protocols for ad hoc networks
		C121.3	Analyze data transmission and geocasting in ad hoc and wireless sensor networks (ASN)
		C121.4	To understand the applications of ad hoc and sensor networks
		C121.5	Understand basics of Wireless, Sensors and Lower Layer Issues of WSN
		C121.6	Understand basics of Upper Layer Issues of WSN
C122	**Social Media Analytics (Professional Elective-II)**	**C122.1**	Understanding characteristics and types of social media
		C122.2	Knowledge on layers of social media analytics
		C122.3	Apply text analysis tools on social media data
		C122.4	Understand the significance of action analytics
		C122.5	Detect viral topics on social media (YouTube)
		C122.6	Analyze social media engagement and sentiment
C123	**Web and Database Security (Professional Elective**	**C123.1**	Understand the Web architecture and applications
		C123.2	Understand client side and server-side programming
		C123.3	Understand the principles of database security.
		C123.4	Understand the advances in access control models.
		C123.5	Understand how common mistakes can be bypassed and exploit the application
		C123.6	Identify common application vulnerabilities
C103	**Advanced Data Structures Lab (using Python)**	**C103.1**	Examine all Python syntax and semantics and apply to implement all datastructures.
		C103.2	Develop Python Programs using basic data structures and Regular Expressions.
		C103.3	Implement all linear data structures in python using linked list
		C103.4	Develop python applications using non-linear data structures like trees and graphs.

C131	**Image and Video Processing (Professional Elective-I Lab)**	**C131.1**	Understand theory and models in Image and Video Processing.
		C131.2	Explain the need of spatial and frequency domain techniques for image compression.
		C131.3	Comprehend different methods for video processing, motion estimation, and quantitative models of image and video segmentation.
		C131.4	Apply the process of image enhancement for optimal use of resources.
C132	**Advanced Databases (Professional Elective-I Lab)**		
		C132.1	Understand Database system Architectures and parallel databases.
		C132.2	Analyze transactions, Concurrency Control in Distributed Databases.
		C132.3	Understand the importance of Data Warehousing and Mining.
		C132.4	Illustrate concepts of object-based databases.
C133	**Data Wrangling and Visualization (Professional Elective-I Lab)**	**C133.1**	Create data from various data repositories and perform data wrangling.
		C133.2	Explain principles of visual perception.
		C133.3	Apply core skills for visual analysis and visualization techniques for various data analysis tasks.
		C133.4	Evaluate visualization techniques
C104	**Research Methodology & IPR**	**C104.1**	Understand the characteristics and formulation of research problem.
		C104.2	Analyze the approaches for literature survey and plagiarism.
		C104.3	Apply the techniques for research proposal writing and presentation skills.
		C104.4	Understand the effectiveness and importance of Intellectual Property Rights in research.
		C104.5	Apply the steps to get grants of patents and patenting under PCT
		C104.6	Analyze the approaches of property rights and new developments to create new and better products.
I Year II Semester			
C201	**Big Data Analytics**	**C201.1**	To explain the foundations, definitions, and challenges of Big Data and various Analytical tools.
		C201.2	To comprehend Hadoop Ecosystem, Map reduce, and Hbase.
		C201.3	To illustrate Big Data analytics and Text Analytics using tools.
		C201.4	To apply visualization for big data using Tableau Software.
		C201.5	To assess the importance of Big Data in Social Media and Text Mining.
		C201.6	To recognize the importance of Mobile Analytics and perform it using tools.
C202	**Deep Learning**	**C202.1**	Implement deep learning algorithms, understand neural networks and traverse the layers of data.

		C202.2	Learn topics such as convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces.
		C202.3	Understand applications of Deep Learning to Computer Vision.
		C202.4	Understand applications of Deep Learning to computer vision with LSTM and Attention Models.
		C202.5	Understand and analyze Applications of Deep Learning to NLP.
		C202.6	Understand and analyze classification using neural networks.
C211	**Edge Analytics (Professiona Elective-III)**	**C211.1**	Understand the concepts of Edge Analytics, both in theory and in practical application.
		C211.2	Comprehend concepts Edge Computing based on sensing and Internet connectivity.
		C211.3	Demonstrate a comprehensive understanding of different tools used at edge analytics.
		C211.4	Elaborate python programming with various interfacing devices using with Raspberry PI.
		C211.5	Illustrate edge intelligence with microcontrollers, Azure Machine Learning designer, Azure IoT edge custom vision.
		C211.6	Conceptualize applications implementing edge computing.
C212	**Blockchain Technology (Professional Elective-III)**	**C212.1**	Describe the fundamental characteristics of Blockchain using bitcoin and other crypto currencies.
		C212.2	Develop smart contracts in Ethereum framework Demonstrate the application of hashing and public key cryptography in protecting the blockchain.
		C212.3	Understand public block chain system, Private block chain system and consortium block chain .
		C212.4	Analyze the security issues of Blockchain technology.
		C212.5	Explore Blockchain Case Studies.
		C212.6	Illustrate Hyperledger Fabric and develop applications using Fabric Java SDK.
C213	**Enterprise Cloud Concepts (Profession Elective-III)**	**C213.1**	Describe the fundamental concepts, roles, and boundaries in cloud computing.
		C213.2	Analyze the impact of broadband networks and internet architecture on the reliability and performance of enterprise cloud solutions.
		C213.3	Utilize virtualization technology to create and manage virtualized resources in enterprise cloud environments.
		C213.4	Apply principles of cloud bursting architecture to dynamically scale resources in response to varying workload demands.
		C213.5	Implement cloud technologies and services to enable the transition of an enterprise into a cloud-enabled organization.
		C213.6	Analyze the benefits and challenges of transitioning to cloud-centric enterprises.
C221	**Predictive**	**C221.1**	Understand the theories, and approaches of

	Analytics (Professional Elective-IV)		classification and Regression.
		C221.2	Analyze model assessment, selection and validation for model building.
		C221.3	Illustrate various classification and Regression model & its statistical approaches.
		C221.4	Comprehend Numerical Optimization for model building.
		C221.5	Analyze supervised algorithms & its statistical approaches.
		C221.6	Analyze supervised algorithms & its statistical approaches.
C222	**Machine Translation (Professional Elective-IV)**	**C222.1**	Inspect the approaches and paradigms in machine translation.
		C222.2	Make use of Learning Bilingual word Mappings in machine translation.
		C222.3	Compare various phrase based machine translation techniques.
		C222.4	Examine the rule based machine translation technique with inter lingual representation.
		C222.5	Identify the role of transfer based machine translation in rule based machine translation.
		C222.6	Analyze the example based machine translation.
C223	**Nature Inspired Computing (Professional Elective-IV)**	**C223.1**	Understand the principles and mechanisms behind bio-inspired models utilizing swarm models and hyper-heuristic functions to solve optimization problems.
		C223.2	Apply the mathematical foundation of genetic algorithm to implement crossover and mutation operators.
		C223.3	Analyze the influence of local information and pheromone trails on the decision-making process of ants.
		C223.4	Analyze the principles and mechanisms of particle swarm algorithms behavior with characteristics of artificial bee colony in various domains.
		C223.5	Evaluate the effectiveness and efficiency of selected nature-inspired techniques in solving optimization problems with use cases.
		C223.6	Evaluate the impact of nature inspired techniques through case studies.
C203	**Big Data Analytics (Professional Elective-III Lab)**	**C203.1**	Justify the importance of big data tools - HADOOP and Map reduce in data analytics.
		C203.2	Determine the role of Pig and Cassandra tools in big data applications.
		C203.3	Compare the use of MS Excel as an Analytical tool and a visualization tool.
		C203.4	Examine the use of R programming in projects on statistical analysis and visualization of social media data.
C231	**Edge Analytics (Professiona**	**C231.1**	Understand the benefits of edge computing, microservices

	Elective-III Lab)	**C231.2**	Conceptualize applications implementing services in the edge
		C231.3	Develop use cases in IoT with edge computing
		C231.4	Demonstrate a comprehensive understanding of implementation of services, use cases in MEC
C232	**Blockchain Technology (Professional Elective-III L**	**C232.1**	Learn and understand the blockchain lab setup.
		C232.2	Apply knowledge on Blockchain Technology to develop basic blockchain applications.
		C232.3	Develop solidity programs to handle exceptions
		C232.4	Design Hyperledger Fabric Network and develop programs using Fabric Java SDK
C233	**Enterprise Cloud Concepts (Professional Elective-III Lab)**	**C233.1**	Understand the process of creating virtual machines using VirtualBox or VMware Workstation.
		C233.2	Apply the knowledge of installing Google App Engine to set up the development environment for cloud-based web applications.
		C233.3	Demonstrate the ability to configure network settings and establish connectivity between virtual machines to enable file transfer.
		C233.4	Design a step-by-step procedure or guide for installing and configuring a single- node Hadoop cluster.
I Year I Semester & II Semester **(Audit Course-I & II)**			
C501	**English for Research Paper Writing**	**C501.1**	Apply correct style of referencing and use punctuation appropriately
		C501.2	Demonstrate writing meaningful sentences and coherent paragraphs
		C501.3	Show conciseness, clarity and avoid redundancy in writing
		C501.4	Summarize, evaluate literature, and write methodology, results and conclusion
		C501.5	Describe how to develop title, write abstract and introduction
		C501.6	Understand that how to improve your writing skills and level of readability
C502	**Disaster Management**	**C502.1**	Understand the concept of Disaster Management Cycle and Framework
		C502.2	Explain the Applications of Science and Technology for Disaster Management& Mitigation
		C502.3	Impart knowledge of causes of various disaster
		C502.4	Understand the key concepts in disaster risk reduction and humanitarian response
		C502.5	Understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries
		C502.6	Enhance awareness of Disaster Risk Management institutional processes
C503	**Sanskrit for Technical**	**C503.1**	Understand the basic Sanskrit language

	Knowledge	**C503.2**	Ancient Sanskrit literature about science & technology can be understood
		C503.3	Being a logical language will help to develop logic in students
		C503.4	Understand the students to know the basic Sanskrit Grammar and Literature
		C503.5	Understand the History of Epigraphical study in India
		C503.6	Enhance the students to know the Knowledge of ontology and trends Indian Philosophy.
C504	**Value Education**	**C504.1**	Knowledge of self-development.
		C504.2	Learn the importance of Human values Developing the overall personality.
		C504.3	Understand the importance of value based living.
		C504.4	Emerge as responsible citizens with clear conviction to practice values and ethics inlife.
		C504.5	Become value based professionals.
		C504.6	Contribute in building a healthy nation.
C505	**Constitution of India**	**C505.1**	Understand the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics
		C505.2	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India
		C505.3	Understand the circumstances surrounding the foundation of the Congress Socialist Party
		C505.4	Enhance the passage of the Hindu Code Bill of 1956
		C505.5	Know the importance of Constitution and Government
		C505.6	Become Good Citizens and know their fundamental rights, duties and principles.
C506	**Pedagogy Studies**	**C506.1**	Develop a positive attitude towards life and teaching profession
		C506.2	Analyze the classroom teaching learning and the ability to observe classroombehaviour.
		C506.3	Understand process of communication and use them in their classroom teaching and inculcate multiculturism
		C506.4	Use of models of teaching by applying knowledge to make teaching effective
		C506.5	Use the collaborative learning into a course in a way that aligns with students learning objectives and intended outcomes
		C506.6	Develop a positive attitude towards life and teaching profession
C507	**Stress Management by Yoga**	**C507.1**	Develop healthy mind in a healthy body thus improving social health also improve efficiently.
		C507.2	Develop body awareness. Learn how to use their bodies in a healthy way. Perform well in sports and academics.
		C507.3	Will balance, flexibility, and stamina, strengthen muscles and connective tissues enabling good posture
		C507.4	Manage stress through breathing, awareness,

			meditation and healthy movement
		C507.5	Build concentration, confidence and positive self-image
		C507.6	Develop healthy mind in a healthy body thus improving social health
C508	**Personality Development through Life Enlightenmen Skills**	**C508.1**	Understand their Personality and achieve their highest Goals of Life
		C508.2	Learn to build Positive Attitude, Self-Motivation, enhancing Self-Esteem and Emotional Intelligence
		C508.3	Analyze and Develop Time management, Team management, Work ethics, good manners and personal and professional Etiquettes
		C508.4	Lead the nation and mankind to peace prosperity and practice emotional self- regulation
		C508.5	Learn to develop coping mechanism to manage Stress through Yoga and Meditation Techniques and develop a versatile personality
		C508.6	Study of Neetishatakam will help in developing versatile personality of students