VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY
(AUTONOMOUS)
(Approved by AICTE - New Delhi & Affiliated to JNTUGV, Vizianagaram)
Beside VSEZ, Duvvada, Vadlapudi Post, Gajuwaka, Visakhapatnam - 530 049.

# VR19 - Regulation

# COURSE OUTCOMES

# (B.Tech, M. Tech, MBA & MCA)

JYOTHULA SUDHAKAR

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Date: 2023-09-04 11:58+06:00

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# Course Outcomes of VR19 Regulation

# Index

**Click Page Number to Navigate**

**VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY (A)**
**DEPARTMENT OF CIVIL ENGINEERING**
**VR19 B.Tech - Civil Engineering Course Ourcomes**

| S.No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 1 | VR19 | 01 | B.Tech-Civil Engineering | 1000191100 | Mathametics-1 | CO1 | Executing mean value theorems and evaluate maxima and minima of functions of two variables without constraints |
| | | | | | | CO2 | Apply the analytical methods to solve higher order linear differential equations. |
| | | | | | | CO3 | Evaluate of solution of Ordinary differential equations by using Laplace Transform techniques |
| | | | | | | CO4 | Identify and solve partial differential equations. |
| 2 | VR19 | 01 | B.Tech-Civil Engineering | 1000191120 | Engineering Physics | CO1 | Apply the knowledge of crystal systems and X-ray diffraction techniques. to identify the crystal structure of materials. |
| | | | | | | CO2 | Use the knowledge of acoustics and ultra-sonics for characterization of acoustics design and non-destructive testing. |
| | | | | | | CO3 | Describe the wave phenomena and apply these concepts for construction of Lasers and optical fibers. |
| | | | | | | CO4 | Discussthe properties and synthesis techniques of nanomaterials. |
| 3 | VR19 | 01 | B.Tech-Civil Engineering | 1000191121 | Technical English Communication | CO1 | Read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources, Social Awareness |
| | | | | | | CO2 | Analyze the functions of language and grammar in spoken and written forms |
| | | | | | | CO3 | Write effectively on various domains |
| | | | | | | CO4 | Prepare and exhibit oral presentation skills by using ICT(Individual/Team) |
| 4 | VR19 | 01 | B.Tech-Civil Engineering | 1003191100 | Engineering Mechanics | CO1 | Analyze the force systems for equilibrium conditions and able to draw free body diagram. |
| | | | | | | CO2 | Evaluate the frictional forces between contact surfaces. |
| | | | | | | CO3 | Differentiate between centroid and center of gravity and determine Centroid, center of gravity and second moment of area for composite sections. |
| | | | | | | CO4 | Analyze the motion and calculate trajectory characteristics. |
| 5 | VR19 | 01 | B.Tech-Civil Engineering | 1005191120 | Problem solving and programming using C | CO1 | Interpret fundamentals of computers and convert flowcharts/algorithms to C Programs |
| | | | | | | CO2 | Apply decision making and iterative feature of C programming language effectively |
| | | | | | | CO3 | Develop programs using modular techniques |
| | | | | | | CO4 | Make use of user defined datatypes and implement them for various applications |

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| 6 | VR19 | 01 | B.Tech-Civil Engineering | 1000191130 | Constitution of India | CO1 | Have general knowledge and legal literacy and thereby to take up competitive examinations. |
| | | | | | | CO2 | Distinguish the power of state and central government |
| | | | | | | CO3 | Summarize the election procedure in India before and after independence |
| | | | | | | CO4 | Association with the powers and functions of Municipalities, Panchayats and Cooperative Societies. |
| 7 | VR19 | 01 | B.Tech-Civil Engineering | 1000191101 | Mathematics-II | CO1 | Solve approximate roots of an equation by using different numerical methods. |
| | | | | | | CO2 | Compute Interpolating polynomial for the given data. |
| | | | | | | CO3 | Compute Numerical Solution of ODE and Numerical Integration. |
| | | | | | | CO4 | Evaluate simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix. |
| 8 | VR19 | 01 | B.Tech-Civil Engineering | 1000191200 | Transform and Vector Calculus | CO1 | Formulate any period function in terms of sine and cosine |
| | | | | | | CO2 | Simplify a non-periodic function as integral representation |
| | | | | | | CO3 | Apply multiple integration techniques in evaluating areas and volume bounded by region. |
| | | | | | | CO4 | Explain Gradient, divergence and curl operations in vector and scalar fields and apply Green's, Gauss and Stokes theorem as the generalisation of fundamental theorem of integral calculus. |
| 9 | VR19 | 01 | B.Tech-Civil Engineering | 1000191220 | Engineering Chemistry | CO1 | Measure water quality parameters, corrosive environment and protection of precious metal. |
| | | | | | | CO2 | Acquire the knowledge on advanced materials |
| | | | | | | CO3 | Analyze the different forms of energy sources |
| | | | | | | CO4 | Identify different polymers and their functionalities |
| 10 | VR19 | 01 | B.Tech-Civil Engineering | 1002191200 | Fundamentals of electrical and electronics engineering | CO1 | Apply Ohms Law and Kirchhoff's Laws and solve electrical circuits |
| | | | | | | CO2 | Describe the constructional features of DC machines, select suitable starters for DC motors estimate losses and efficiency of DC motor. |
| | | | | | | CO3 | Outline the constructional details and operating principles of AC machines and calculate the efficiency identify the characteristics, losses and efficiency of a three-phase induction motor. |
| | | | | | | CO4 | Identify the structure, operation and characteristics and applications of measuringinstruments and semi- conductor devices |
| 11 | VR19 | 01 | B.Tech-Civil Engineering | 1003191101 | Engineering Drawing | CO1 | Understand the use of drawing instruments to construct the polygons and curves |
| | | | | | | CO2 | Learn the principle of orthographic projections. Draw Orthographic projections of points, lines. |
| | | | | | | CO3 | Draw the various types of planes and solids its views in different Positions |
| | | | | | | CO4 | Draw isometric views of simple objects |

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| 12 | VR19 | 01 | B.Tech-Civil Engineering | 1001191210 | Civil Engineering Workshop | CO1 | Set out of building in the field |
| | | | | | | CO2 | Construct a wall of thickness 1½ bricks using English bond |
| | | | | | | CO3 | Install plumbing the fixtures like Tap, T-Joint, Elbow, Bend, Threading. |
| | | | | | | CO4 | Apply wall putty, painting of wall base coat and laying of tile flooring |
| 13 | VR19 | 01 | B.Tech-Civil Engineering | 1000191110 | Engineering Exploration | CO1 | Realize the purpose/Role of Engineer for solving social problems |
| | | | | | | CO2 | Learn to Design a component/system in an engineering way |
| | | | | | | CO3 | Learn to use mechanisms, Arduino, sensors,motors. |
| | | | | | | CO4 | Integrating different systems (mechanical/Electrical/computer) to work as a unit |
| 14 | VR19 | 01 | B.Tech-Civil Engineering | 1000191131 | Extra-Curricular Activities, Sports And Games (Audit Course) | CO1 | Learn new skills and boost academic performance |
| | | | | | | CO2 | Broader social skills with improved time management |
| | | | | | | CO3 | Explore Interest and Create Broader perspectives |
| | | | | | | CO4 | Participate in various co- curricular activities leading to their multifaceted personality development |
| 15 | VR19 | 01 | B.Tech-Civil Engineering | 1000192100 | Complex Variables and Statistical Methods | CO1 | Analyse the complex integration by using Cauchy's integral formula and find Taylor's, Maclaurin's series and Laurent series expansion of complex function. |
| | | | | | | CO2 | Evaluate contour integrals by using Residue theorem and explain the notation of random variables and evaluate the expected value and probability of random variables |
| | | | | | | CO3 | Evaluate the confidence levels and maximum errors for large and small samplings and apply the concept of hypothesis testing for large and small samples in real life situations. |
| | | | | | | CO4 | Examine correlation for bi-variate data and predict the regression analysis. |
| 16 | VR19 | 01 | B.Tech-Civil Engineering | 1001192120 | Surveying | CO1 | Interpret various instruments to evaluate the required fields of surveying. |
| | | | | | | CO2 | Describe levelling survey to find elevations followed by contour mapping. |
| | | | | | | CO3 | Estimate the distances, areas and volumes, elevations using various advanced methodologies solving most practical problems. |
| | | | | | | CO4 | Organize simple and compound curves along with examining the various measurements in accessing the aerial surveying with GPS devices. |
| 17 | VR19 | 01 | B.Tech-Civil Engineering | 1001192100 | Building Materials and Construction | CO1 | Predict the properties of building stones, bricks, tiles and its classifications. |
| | | | | | | CO2 | Describe the types of masonry and the properties, types, defects and alternatives of wood |
| | | | | | | CO3 | Identify building components include lintels, staircases, floors, roofs and trusses |
| | | | | | | CO4 | Distinguish the finishings include proofing, plastering, pointing, washing, paints and describe formwork and scaffolding. |

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| 18 | VR19 | 01 | B.Tech-Civil Engineering | 1001192121 | Strength of Materials | CO1 | Understand the basics of material properties, stress and strain and evaluate the stress of thin cylinders. |
| | | | | | | CO2 | Compute the shear force bending moment of beams and |
| | | | | | | CO3 | Determine the flexural stresses, shear stresses and deflection in beams and springs |
| | | | | | | CO4 | Analyze columns and strutssubjected to axial loading under various end conditions anddetermine the deflections androtations produced by Torsionalloading of shafts |
| 19 | VR19 | 01 | B.Tech-Civil Engineering | 1001192122 | Fluid Mechanics | CO1 | Describe the physical properties of fluids & their influences on fluid motion and Compute hydro static forces on various sub merged Surfaces. |
| | | | | | | CO2 | Compare the concepts of kinematics and dynamics of fluid flow. |
| | | | | | | CO3 | Analyze the boundary layer of fluid in laminar and turbulent flows. |
| | | | | | | CO4 | Calibrate flow in pitot tube, venturi meter, orifice meter, orifices, notches and weirs |
| 20 | VR19 | 01 | B.Tech-Civil Engineering | 1001192101 | Building Planning and Drawing | CO1 | Utilize the building byelaws and regulations for construction. |
| | | | | | | CO2 | Describe the orientation, standards, requirements, types and planning of various residential and public buildings. |
| | | | | | | CO3 | Draw the sign conventions of various types of building materials and bonds. |
| | | | | | | CO4 | Produce plans and sectional elevations of various residential and public buildings. |
| 21 | VR19 | 01 | B.Tech-Civil Engineering | 1001192200 | Structural Analysis-I | CO1 | Distinguish between stable and unstable and statically determinate and indeterminate structures. |
| | | | | | | CO2 | Analyze the S.F, B.M and deflection of propped, fixed and continuous beams. |
| | | | | | | CO3 | Calculate the deflections of beams by using strain energy method and apply the moment distribution method and slope deflection method to analyze statically indeterminate structures |
| | | | | | | CO4 | Evaluate and draw the influence lines for reactions, shears, and bending moments in beams and girders due to moving loads. |
| 22 | VR19 | 01 | B.Tech-Civil Engineering | 1001192220 | Transportation Engineering | CO1 | Finalize suitable highway alignment and Design of geometric elements for different terrains. |
| | | | | | | CO2 | Describe traffic engineering studies include traffic studies like volume parking, signaling, accident etc. |
| | | | | | | CO3 | Distinguish the highway materials and its suitability for different types pavement |
| | | | | | | CO4 | Assess the required Ideal Railway Alignment and suitable site for airport construction |

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| 23 | VR19 | 01 | B.Tech-Civil Engineering | 1001192221 | Hydraulic and Hydraulic Machinery | CO1 | Analyzing the behaviour of uniform and non- uniform flow in a open channel. |
| | | | | | | CO2 | Creating a model for a prototype by using the concept of simulation techniques. |
| | | | | | | CO3 | Applying the concept of generating hydroelectricity using hydraulic turbines. |
| | | | | | | CO4 | Estimate the head and discharge through Centrifugal-Pumps and Reciprocating-Pumps in detail |
| 24 | VR19 | 01 | B.Tech-Civil Engineering | 1001192222 | Environmental Engineering | CO1 | Analyze problems associated with water supply engineering |
| | | | | | | CO2 | Design water conveyance, treatment, storage and distribution systems. |
| | | | | | | CO3 | Solve societal water supply engineering problems through proper investigations and interpretation |
| | | | | | | CO4 | Determine and maintain quality standards in water supply schemes. |
| 25 | VR19 | 01 | B.Tech-Civil Engineering | 1020192100- | Employability Readiness Program-1 (Open Elective-1) | CO1 | Interpret and participate in writing skills that are needed in an organisation |
| | | | | | | CO2 | Recognize the need of core competencies to succeed in professional and personal life. |
| | | | | | | CO3 | Solve various basic mathematics problems by following different methods and to perform in various competitive exams and placement drives. |
| | | | | | | CO4 | Apply shortcut methods to solve problems and confidently. |
| 26 | VR19 | 01 | B.Tech-Civil Engineering | 1020192101 | Public Administration | CO1 | Interpret and manage in public governance |
| | | | | | | CO2 | Participate in and contribute to the policy process. |
| | | | | | | CO3 | Analyse, think critically, solve problems and make decisions. |
| | | | | | | CO4 | Articulate and apply a public service perspective. |
| 27 | VR19 | 01 | B.Tech-Civil Engineering | 1020192102 | Foreign Linguistic - French | CO1 | Construct simple sentences in French using Syntax and grammar. |
| | | | | | | CO2 | Pronounce and read French reasonably well. |
| | | | | | | CO3 | Demonstrate an elementary knowledge of French sentence through speaking and writing |
| | | | | | | CO4 | Apply basic spoken French and demonstrate understanding by writing and/or responding properly |

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| 28 | VR19 | 01 | B.Tech-Civil Engineering | 1000192130 | Environmental Science (Audit Course) | CO1 | Gain a higher level of personal involvement and interest in understanding and solving environmental resource problems and its sustainable conservation practices. |
| | | | | | | CO2 | Overall understanding of the relationship between man and ecosystem & biodiversity. |
| | | | | | | CO3 | Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century. |
| | | | | | | CO4 | Recognize the interconnectedness of human dependence on the earth's ecosystems and influence their society in proper utilization of goods and services. |
| 29 | VR19 | 01 | B.Tech-Civil Engineering | 1000192110 | Communication Skills Lab | CO1 | Analyse the functions of language and grammar in spoken and written forms with an emphasis on LSRW Skills. |
| | | | | | | CO2 | Disseminate the relevant skills while performing GDs, interviews, oral presentations with a focus on Non- verbal communication. |
| | | | | | | CO3 | Prepare and exhibit oral presentation skills by using ICT. (Individual/Team) |
| | | | | | | CO4 | Organize proper life skills for their employability. |
| 30 | VR19 | 01 | B.Tech-Civil Engineering | 1001192170 | Mini Project-I (EPICS/Societal Relevant Project) | CO1 | Understand the various social problems present in the world &problem to develop a technological project |
| | | | | | | CO2 | Utilise the design thinking and project management with various technical software in addressing the project Apply the engineering knowledge, |
| | | | | | | CO3 | mathematics, design thinking and project management to develop a community project. |
| | | | | | | CO4 | Recogniseprofessional responsibilities and make informed judgements in civil practice. |
| 31 | VR19 | 01 | B.Tech-Civil Engineering | 1099192100 | Managerial Economics and Financial Analysis | CO1 | Analyse the Demand, Price and Cost. |
| | | | | | | CO2 | Identify the Nature of different markets |
| | | | | | | CO3 | Understand Various Business Forms. |
| | | | | | | CO4 | Evaluate investment project proposals. |
| 32 | VR19 | 01 | B.Tech-Civil Engineering | 1001193120 | Concerete Technology | CO1 | Identify the various types of materials and understand the quality control tests on construction materials |
| | | | | | | CO2 | Assimilate the behaviour of fresh concrete and special concretes. |
| | | | | | | CO3 | Determine the durability properties of hardened concrete. |
| | | | | | | CO4 | Design various grades of concrete mixes as per IS Code. |

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| 33 | VR19 | 01 | B.Tech-Civil Engineering | 1001193121 | Geotechnical Engineering | CO1 | Classify the different types of soil using Indian Standards |
| | | | | | | CO2 | Analyse the permeability of soils and solve seepage related problems. |
| | | | | | | CO3 | Evaluate the stresses transformed through soils and compute geostatic and induced stresses |
| | | | | | | CO4 | Evaluate the rate of consolidation, time rate of settlement and shear parameters of the effected by different drainage conditions. |
| 34 | VR19 | 01 | B.Tech-Civil Engineering | 1001193100 | Hydrology and Water Resources Engineering | CO1 | Sketch the hydrologic cycle and discuss its impact on Environment. |
| | | | | | | CO2 | Estimate various abstractions from Precipitation like Evaporation, Evapotranspiration and Infiltration. |
| | | | | | | CO3 | Develop Hydrographs of a Catchment by evaluation the rainfall trends. |
| | | | | | | CO4 | Analyse frequency of Floods to estimate design flood, flood routing and groundwater movement. |
| 35 | VR19 | 01 | B.Tech-Civil Engineering | 1001193101 | Design of Reinfored Concrete Structures | CO1 | Interpret the concepts of working stress method and the limit state method and their relation to the design of structures. |
| | | | | | | CO2 | Outline the behaviour of RCC structural members for safe design. |
| | | | | | | CO3 | Identify reinforced concrete beam failure modes under shear, torsion and design reinforcement details. |
| | | | | | | CO4 | Design basic structural elements (beams, slabs, columns, footings and staircase) according to the design code of IS 456: 2000. |
| 36 | VR19 | 01 | B.Tech-Civil Engineering | 1020193160 | Employability Readiness Program -2 | CO1 | Have adequate writing skills that are in an organisation and perform well during campus drives and different interviews |
| | | | | | | CO2 | Understand the core competencies to succeed in professional and personal life and develop knowledge & experience with the use of standard programming language |
| | | | | | | CO3 | Solve various Basic Mathematics problems byfollowing different methods and analysis,quantitative forms including table, graphs andformulas |
| | | | | | | CO4 | Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both intheir professional as well as personal life. |
| 37 | VR19 | 01 | B.Tech-Civil Engineering | 1002193160 | Solar Photovoltaic Energy Systems | CO1 | Explain the fundamentals of solar photovoltaic (PV) energy systems |
| | | | | | | CO2 | Analyse the characteristics of solar radiation, PV cells, modules and arrays |
| | | | | | | CO3 | Design of Stand-Alone PV Schemes with battery energy storage and grid- connected PV schemes |
| | | | | | | CO4 | Analyse the system level issues related to PV energy systems |
| 38 | VR19 | 01 | B.Tech-Civil Engineering | 1005193160 | Programming in C++ | CO1 | Understand the basic terminology used in object-oriented programming |
| | | | | | | CO2 | Describe the object-oriented programming approach in connection with C++ |
| | | | | | | CO3 | Apply the concepts of object-oriented programming |
| | | | | | | CO4 | Apply virtual and pure virtual function and complex programming situations |

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| 39 | VR19 | 01 | B.Tech-Civil Engineering | 1003193160 | Industrial Robotics | CO1 | Summarize robot components, configurations and different end effectors. |
| | | | | | | CO2 | Select a robot for a given application and illustrate the working principles of various actuators and sensors that can be used in the manipulator, control system that can be used as well as the method of programming the robot. |
| | | | | | | CO3 | Analyse a given serial manipulator kinematically and dynamically. |
| | | | | | | CO4 | Derive as well as analyse the equation of trajectory that the end-effector should follow given the boundary conditions. |
| 40 | VR19 | 01 | B.Tech-Civil Engineering | 1001193180 | Technical Seminar | CO1 | Analyse a complex engineering problem and to apply principles of civil engineering and relevant disciplines to identify solutions |
| | | | | | | CO2 | Design, implement, and evaluate a solution to meet the requirements in the context of the civil engineering program's discipline. |
| | | | | | | CO3 | Apply civil engineering fundamentals to produce proper solutions to real world problems. |
| | | | | | | CO4 | Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles. |
| 41 | VR19 | 01 | B.Tech-Civil Engineering | 1099193130 | Universal Human Values and Professional Ethics | CO1 | Relate Ethical Human Values . |
| | | | | | | CO2 | Apply Engineering knowledge for societal benefits. |
| | | | | | | CO3 | Demonstrate responsibility for Safety, Risk & rights. |
| | | | | | | CO4 | Outline the various Current Global Issues |
| 42 | VR19 | 01 | B.Tech-Civil Engineering | 1099192200 | Management Science | CO1 | Illustrate basic insights of management principles |
| | | | | | | CO2 | Summarize Production process, and Inventory techniques |
| | | | | | | CO3 | Apply Strategies and policies to functional areas. |
| | | | | | | CO4 | Understand Contemporary management Practices. |

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| 43 | VR19 | 01 | B.Tech-Civil Engineering | 1001193201 | Design of Steel Structures | CO1 | Identify the failure modes of bolted and welded different connections, and determine their Understanding design strengths. |
| | | | | | | CO2 | analyze and design tension members xompression members and beams |
| | | | | | | CO3 | create the solution for purlins to withstand the wind loads. |
| | | | | | | CO4 | design and complecated structurelike plategrider -I |
| 44 | VR19 | 01 | B.Tech-Civil Engineering | 1001193202 | Engineering Geology | CO1 | Understand the failure of some civil engineering constructions due to geological drawbacks through some case histories. |
| | | | | | | CO2 | Differentiate various rock forming minerals and economic minerals based on their physical properties and distinguish igneous, sedimentary and metamorphic rocks based on megascopic properties |
| | | | | | | CO3 | Describe the common geological structures associate within different rock strata and classify |
| | | | | | | CO4 | Investigate the project site or site selection for mega/mini civil engineering projects like Dams, Tunnels, disposal sites etc applying geological and geophysical methods such as Electrical resistivity method, seismic methods, gravity methods etc. |
| 45 | VR19 | 01 | B.Tech-Civil Engineering | 1001193203 | Estimation Specifications & Contracst | CO1 | Understand the preparation of an Abstract Estimate and detailed estimate of building |
| | | | | | | CO2 | Calculate the quantity of materials required for civil works as per specifications |
| | | | | | | CO3 | Determine earth work quantity for roads and canals |
| | | | | | | CO4 | Design bar bending schedule for reinforcement works, identify specifications and tendering process for contracts and create various tender documents for bidding purpose |
| 46 | VR19 | 01 | B.Tech-Civil Engineering | 1001193250 | Advanced Structural Analysis | CO1 | Analyze the two hinged and three hinged arches for different support levels |
| | | | | | | CO2 | Analyze structures using portal and cantilever methods |
| | | | | | | CO3 | Analyze Cable structures and plastic behavior of structures |
| | | | | | | CO4 | Analyze structures using Kani's and Matrix methods. |
| 47 | VR19 | 01 | B.Tech-Civil Engineering | 1001193251 | Environmental Pollution Control | CO1 | Have knowledge on air pollutant control devices and the NAAQ standards. |
| | | | | | | CO2 | Differentiate the treatment techniques used for solid and industrial wastewater treatment methods. |
| | | | | | | CO3 | Appreciate the methods of environmental sanitation and the management of community facilities without spread of epidemics. |
| | | | | | | CO4 | Appreciate the importance of sustainable development while planning a project or executing an activity. |
| 48 | VR19 | 01 | B.Tech-Civil Engineering | 1001193252 | Geotechnical Engineering-II | CO1 | Prepare the soil investigation report by using suitable field test |
| | | | | | | CO2 | Analyze stability of slopes using suitable methods |
| | | | | | | CO3 | Calculate the earth pressure values for design of retaining structures |
| | | | | | | CO4 | Determine the bearing capacity of the soil using different theories |

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| 49 | VR19 | 01 | B.Tech-Civil Engineering | 1001193253 | Hydraulic Structures | CO1 | Correlate Water requirement of different crops in each season. |
| | | | | | | CO2 | Design lined & unlined canalwithout impacting the surroundings during floods. |
| | | | | | | CO3 | distinguish differentdrainage works and regulation works |
| | | | | | | CO4 | analyse the safety andstabilioty of gravity dams |
| 50 | VR19 | 01 | B.Tech-Civil Engineering | 1001193254 | Subsurface Investigation and Instrumentation | CO1 | Plan subsurface investigation based on the requirement of project and site condition |
| | | | | | | CO2 | Execute subsurface exploration tests, collect disturbed/undisturbed samples for laboratory tests and suggest design parameters |
| | | | | | | CO3 | Adopt suitable methods for estimation of soil properties required for design |
| | | | | | | CO4 | Work with relevant instrumentation required for characterizing the soil and rock with interdisciplinary approach. |
| 51 | VR19 | 01 | B.Tech-Civil Engineering | 1001193255 | Traffic Engineering and Management | CO1 | Analyse Traffic Problems And Plan For Traffic Systems Various Uses Based on Traffic Surveys |
| | | | | | | CO2 | Design of intersection facilities including pedestrian facilities and cycle tracks |
| | | | | | | CO3 | Design of control devices for improving vehicular flows and Develop efficient Traffic Management Systems. |
| | | | | | | CO4 | Application of Traffic demand and management techniques for improving vehicular flows. |
| 52 | VR19 | 01 | B.Tech-Civil Engineering | 1002193260 | Electric Vehicles | CO1 | Explain the concepts and drive train configurations of electric drive vehicles. |
| | | | | | | CO2 | Describe different electric propulsion systems and energy storage devices |
| | | | | | | CO3 | Discuss the technology, design methodologies and control strategy of electric vehicles. |
| | | | | | | CO4 | Explain battery charger topologies for electric vehicles and discuss how the sizing of the drive system is done and energy management strategies used in electric. |
| 53 | VR19 | 01 | B.Tech-Civil Engineering | 1019193260 | Internet of Things | CO1 | Understand the Architecture, protocols and applications of IoT. |
| | | | | | | CO2 | Analyse the communication protocols and standards used in IoT |
| | | | | | | CO3 | Design the simple IoT applications to monitor or control IoT devices using simulation or hardware |
| | | | | | | CO4 | implement real time applications |
| 54 | VR19 | 01 | B.Tech-Civil Engineering | 1005193261 | Oops through Java | CO1 | Relate the procedural and object paradigm, with real world entities |
| | | | | | | CO2 | Use Exception handling and multithreading mechanisms to create efficient software application |
| | | | | | | CO3 | Implement GUI Applications with modern tools |
| | | | | | | CO4 | Design various layouts along with applet usage |
| 55 | VR19 | 01 | B.Tech-Civil Engineering | 1001193210 | Computer Aided Civil Engineering Drawing | CO1 | Make use of the conventional signs and symbols |
| | | | | | | CO2 | Draw the plan and sectional elevation of footing |
| | | | | | | CO3 | Design the plan, elevation and section of single storied and multi storied building |
| | | | | | | CO4 | Develop the plan and cross section of doglegged staircase |

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| 56 | VR19 | 01 | B.Tech-Civil Engineering | 1001193270 | Mini Project-II | CO1 | Analyse a complex engineering problem and to apply principles of civil engineering and relevant disciplines to identify solutions |
| | | | | | | CO2 | Design, implement, and evaluate a solution to meet the requirements in the context of the civil engineering program's discipline |
| | | | | | | CO3 | Apply civil engineering fundamentals to produce proper solutions to real world problems. |
| | | | | | | CO4 | Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles. |
| 57 | VR19 | 01 | B.Tech-Civil Engineering | 1001194111 | GIS and Remote Sensing Applications | CO1 | Retrieve the information content of remotely sensed data. |
| | | | | | | CO2 | Compute an image visually and digitally with digital image processing techniques. |
| | | | | | | CO3 | illustrate GIS applications in Civil Engineering domain |
| | | | | | | CO4 | Analyze spatial and attribute data for solving spatial problems |
| 58 | VR19 | 01 | B.Tech-Civil Engineering | 1001194110 | Computer Aided Design Lab | CO1 | Design of beams, columns and frames for RCC and steel by using Staad pro |
| | | | | | | CO2 | Design of slabs, towers, buildings and water tank by using Staad pro |
| | | | | | | C03 | At the end of the course the student acquires hands on experience in design |
| | | | | | | CO4 | Prepare structural drawings for concrete / steel structures normally encountered in Civil Engineering practice |
| 59 | VR19 | 01 | B.Tech-Civil Engineering | 1001194150 | Prestressed Concrete | CO1 | Understand the concepts of pre-stressing in concrete structures and identify the materials for pre-stressing . |
| | | | | | | CO2 | Calculate the stresses, losses and deflections of pre and post tensioned memebers. |
| | | | | | | CO3 | Design flexure and shear reinforcement for prestressed concrete |
| | | | | | | CO4 | Interpet the torsional reinforcement and calculate the anchorage zone stresses in pre and post tension. |
| 60 | VR19 | 01 | B.Tech-Civil Engineering | | Railway, Airport and Harbour Engineering | CO1 | Design geometrics in a railway track |
| | | | | | | CO2 | Illustrate the master plan and site selection for Railway station and airport |
| | | | | | | CO3 | Design geometrics for airfield pavements |
| | | | | | | CO4 | Plan, construct and maintain docks and harbours |
| 61 | VR19 | 01 | B.Tech-Civil Engineering | 1001194155 | Industrial Waste and Waste Water Engineering | CO1 | Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation |
| | | | | | | CO2 | Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation |
| | | | | | | CO3 | Describe the common methods of treatment in different industries |
| | | | | | | CO4 | Explain operational problems of common effluent treatment plant |
| 62 | VR19 | 01 | B.Tech-Civil Engineering | 1001194152 | Construction Technology and Management | CO1 | Construct network diagrams and compute critical path, slack and floats for a given network diagram. |
| | | | | | | CO2 | Apply techniques to optimize time, cost and manpower resources. |
| | | | | | | CO3 | Identify the suitable equipment for performing different construction operations. |
| | | | | | | CO4 | Understand the fundamentals of quality management and safety management systems in construction industry |

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| 63 | VR19 | 01 | B.Tech-Civil Engineering | 1001194156 | Payment Analysis and Design | CO1 | Understand The basic of components of pavement, stresses occurred in pavement and the basic elements in design of flexible pavement |
| | | | | | | CO2 | Design of the flexible pavements along with various Standard methods |
| | | | | | | CO3 | Design of the Rigid pavements along with various standard methods |
| | | | | | | CO4 | Analysis of Temperature stresses, reinforced slabs |
| 64 | VR19 | 01 | B.Tech-Civil Engineering | 1001194153 | Environmental Impact Assessment and Management | CO1 | Understand evaluate and create the basic concept of environmental impact assessment, Flow of EIA, Types of environmental Impacts |
| | | | | | | CO2 | Implement different methods in preparing an Environmental Impact Statement |
| | | | | | | CO3 | Identify various mitigation measures that can be used. |
| | | | | | | CO4 | Access environmental impacts and indicate their potential risks through environmental indices and indicators |
| 65 | VR19 | 01 | B.Tech-Civil Engineering | 1001194158 | Soil Dynamics and Foundations | CO1 | Analyse the vibration related problems in foundations |
| | | | | | | CO2 | Design the various machine foundations with respect to Indian standards. |
| | | | | | | CO3 | Conduct the various types of tests to find the dynamic properties of the soil |
| | | | | | | CO4 | Calculate the dynamic bearing capacity of soil under shallow and pile foundations |
| 66 | VR19 | 01 | B.Tech-Civil Engineering | 1001194157 | Finite Element Method | CO1 | Understand the basic concepts in Finite element method |
| | | | | | | CO2 | Analyse the one dimensional and two- dimensional problems in finite element method. |
| | | | | | | CO3 | Solve one dimensional problem |
| | | | | | | CO4 | Apply the shape functions and Isoperimetric elements in finite element evaluation |
| 67 | VR19 | 01 | B.Tech-Civil Engineering | 1001194154 | Ground Improvement Techniques | CO1 | Decide the suitable ground improvement method and their suitability to different field situations. |
| | | | | | | CO2 | Design a reinforced earth embankment and check its stability. |
| | | | | | | CO3 | Analyse the various functions of Geosynthetics and their applications in Civil Engineering practice. |
| | | | | | | CO4 | Analyse the various functions of Geosynthetics and their applications in Civil Engineering practice. |
| 68 | VR19 | 01 | B.Tech-Civil Engineering | 1003194160 | Nani Technology | CO1 | Discuss the fundamental principles of nanotechnology and their application to biomedical engineering |
| | | | | | | CO2 | Apply engineering and physics concepts to the nano-scale and non- continuum domain. |
| | | | | | | CO3 | Choose appropriate synthesis technique to synthesize quantum nanostructures of desired size, shape and surface properties |
| | | | | | | CO4 | Evaluate state-of-the-art, characterization methods for nanomaterials, and CO4 determine nanomaterial safety and handling methods required during characterization. |

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| 69 | VR19 | 01 | B.Tech-Civil Engineering | 1003194154 | Power Plant Engineering | CO1 | Understand the working principle of steam power plant and its circuits |
| | | | | | | CO2 | Illustrate the working of diesel and gas power plant and its components and compare it with steam power plant. |
| | | | | | | CO3 | Evaluate the performance of Hydro power plants and explain the components and working nuclear power plants. |
| | | | | | | CO4 | Analyze the economics involved in power plant |
| 70 | VR19 | 01 | B.Tech-Civil Engineering | 1005194160 | Introduction to Machine Learning | CO1 | Recognise the characteristics of machine learning that make it useful to real- world problems |
| | | | | | | CO2 | Characterise the machine learning algorithms as supervised, semi-supervised and un-supervised |
| | | | | | | CO3 | Use support vector machine, regularized regression algorithms. |
| | | | | | | CO4 | Understand the concept behind neural networks for learning non-linear functions |
| 71 | VR19 | 01 | B.Tech-Civil Engineering | 1001194270 | Main Project / Internship | CO1 | Analyse the entrepreneurship design and the business environment. |
| | | | | | | CO2 | Define industrial policies. |
| | | | | | | CO3 | Explain the business preparation. |
| | | | | | | CO4 | Integrate the knowledge of various courses and their applications in industry. |

**VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY (A)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**
**VR19 B.Tech - Electrical and Electronics Engineering**

| S.No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
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| 1 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1000191100 | Mathematics-I | CO1 | Execute mean value theorems and evaluate maxima and minima of functions of two variables without constraints. |
| | | | | | | CO2 | Apply the analytical methods to solve higher order linear differential equations. |
| | | | | | | CO3 | Evaluate and solve initial and boundary value problems arising in engineering stream. |
| | | | | | | CO4 | Identify and solve ordinary differential equations using Laplace transforms |
| 2 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1000191122 | Solid State Physics | CO1 | Understand basic knowledge of crystal structures to characterize the materials using X-ray diffraction techniques. |
| | | | | | | CO2 | Interpret the magnetic and electrical properties of materials. |
| | | | | | | CO3 | Analyzethe important properties of superconductors and their utilization in different engineering applications. |
| | | | | | | CO4 | Analyze energy bands in crystalline solids to understand semiconductor physics. |
| 3 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1000191101 | Mathematics – II | CO1 | Solve approximate roots of an equation by using different numerical methods. |
| | | | | | | CO2 | Compute interpolating polynomial for a given data |
| | | | | | | CO3 | To understand different numerical methods to solve integrations and ordinary differentialequations. |
| | | | | | | CO4 | Solve the system of Linear equations using rank of a matrix and also Eigen values and Eigen vectors of a square matrix |
| 4 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1003191100 | Engineering Mechanics | CO1 | Analyze the force systems for equilibrium conditions and able to draw free body diagram. |
| | | | | | | CO2 | Evaluate the frictional forces between contact surfaces. |
| | | | | | | CO3 | Able to differentiate between centroid and centre of gravity and determine Centroid, centre of gravity and second moment of area for composite sections. |
| | | | | | | CO4 | Analyse the motion and calculate trajectory characteristics. |
| 5 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1005191120 | Problem Solving and Programming using C | CO1 | Interpret fundamentals of computers and convert flowcharts/algorithms to C Programs, compile and debug programs |
| | | | | | | CO2 | Apply decision making and Iterative feature of C Programming language effectively. |
| | | | | | | CO3 | Design and implement programs to analyze the different pointer applications |
| | | | | | | CO4 | Apply structures and unions and Implement file Operations in C programming for any given problem |
| 6 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1000191130 | Constitution of India | CO1 | Have general knowledge and legal literacy and thereby to take up competitiveexaminations |
| | | | | | | CO2 | Understand state and central policies, fundamental duties. |
| | | | | | | CO3 | Understand Electoral Process, special provisions. |
| | | | | | | CO4 | Assess the powers and functions of Municipalities, Panchayats and Cooperative |

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| 7 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1000191131 | Extra-Curricular Activity (Audit Course) | CO1 | Learn new skills |
| | | | | | | CO2 | Boost academic performance |
| | | | | | | CO3 | Broader social skills |
| | | | | | | CO4 | Improve time management |
| 8 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1000191200 | Transforms and Vector Calculus | CO1 | Formulate any period function in terms of sine and cosine |
| | | | | | | CO2 | Simplify a non periodic function as integral representation |
| | | | | | | CO3 | Apply multiple integration techniques in evaluating areas and volume bounded by region. |
| | | | | | | CO4 | Apply Green's, Gauss and Stokes theorem as the generalisation of fundamental theorem of integral calculus. |
| 9 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1000191123 | Applied Chemistry | CO1 | Identification of different polymers and their functionalities |
| | | | | | | CO2 | Determination of structure to many compounds and apply the basic knowledge in construction of cell and its applications |
| | | | | | | CO3 | Analysis of corrosive environments and protection of precious metal |
| | | | | | | CO4 | Adoption of different green methodologies and acquire knowledge on different advanced materials |
| 10 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | | Applied Chemistry - Laboratory | CO1 | Determine hardness and alkalinity of water. |
| | | | | | | CO2 | Determine the concentration of acids. |
| | | | | | | CO3 | Compute the iron (II) by using solutions |
| | | | | | | CO4 | Construct a galvanic cell |
| 11 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002191221 | Electrical Circuit Analysis-I | CO1 | Solve various Electrical networks in the presence of active and passive ELEMENTS |
| | | | | | | CO2 | Analyse Electrical networks with various Network theorems for Dcexcitation |
| | | | | | | CO3 | Illustrate R, L, C networks and solve various networks with ACCO3 excitation along with theorems and Resonance concept |
| | | | | | | CO4 | Compare Electric and Magnetic Circuits and solve Magnetic circuits ALONG WITH DOT CONVENTION |
| 12 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1003191101 | Engineering Drawing | CO1 | Understand the use of drawing instruments to construct the polygons and curves |
| | | | | | | CO2 | Learn the principle of orthographic projections. Draw Orthographic projections of points, lines. |
| | | | | | | CO3 | Draw the various types of planes and solids its views in different Positions |
| | | | | | | CO4 | Draw isometric views of simple objects |

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| 13 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1000191121 | Technical English Communication | CO1 | Read, understand and interpret material on Environment, Science and CO1 Technology, tourism, Energy Sources, Social Awareness |
| | | | | | | CO2 | CO2 Analyze the functions of language and grammar in spoken and written forms. |
| | | | | | | CO3 | Write effectively on various domains.. |
| | | | | | | CO4 | Prepare and exhibit oral presentation skills by using ICT(Individual/Team) |
| 14 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1003191210 | Engineering Workshop | CO1 | Understand different operations: Fitting, smithy, carpentry and Electrical wiring. |
| | | | | | | CO2 | Perform the fitting and carpentry operations. |
| | | | | | | CO3 | Develop simple objects like funnel, elbow etc. using sheet metal. |
| | | | | | | CO4 | Apply basic electrical engineering knowledge for house wiring practice like stair case wiring, series and parallel connections |
| 15 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1000191110 | Engineering Exploration | CO1 | CO1 Realize the purpose/Role of Engineer for solving social problems. |
| | | | | | | CO2 | Design engineering way. a component/system in an |
| | | | | | | CO3 | Implement mechanisms, Arduino, sensors, motors |
| | | | | | | CO4 | Design prototype machine using Arduino Uno board. |
| 16 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002192100 | Fundamentals of Signals and Systems | CO1 | Distinguish between various types of signals and systems. |
| | | | | | | CO2 | Understand the conversion of continuous time signals to discrete time signals and vice versa. |
| | | | | | | CO3 | Interpret continuous time LTI systems |
| | | | | | | CO4 | Analyze discrete time LTI systems |
| 17 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002192120 | Electrical Machines-I | CO1 | Understand the working principle and construction of DC machine and Transformers |
| | | | | | | CO2 | Examine the characteristics and Testing methods of DC Machines and Transformers |
| | | | | | | CO3 | Illustrate speed control methods of DC Motors and study the losses in DC Machines and Transformers |
| | | | | | | CO4 | Develop Phasor diagrams for Transformer with different load conditions |
| 18 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002192101 | Electromagnetic Fields | CO1 | Calculate electric field from various charge distributions and find magnetic field from various current distributions. |
| | | | | | | CO2 | Understand polarization in dielectrics, electric current density, and resistance of conductors and also Calculate force in electric and magnetic fields and torque in magnetic fields. |
| | | | | | | CO3 | Determine inductance, capacitance of different physical configurations. |
| | | | | | | CO4 | Apply Faraday's Law to calculate induced Emf and understand the effect of Electromagnetic radiation. |

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| 19 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1004192122 | Basic Electronic and Circuits | CO1 | Distinguish the characteristics of different diodes and choose appropriate diode for an application based on the operation |
| | | | | | | CO2 | Explain the operation and design aspects of rectifiers, and filter. |
| | | | | | | CO3 | Design different biasing and stabilization circuits and explain compensation techniques for a transistor. |
| | | | | | | CO4 | Analyze positive and negative feedback and the role of feedback in oscillators and amplifiers. |
| 20 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1000192110 | Communication Skills Lab | CO1 | Analyze the functions of language and grammar in spoken and written forms with an emphasis on LSRW Skills. |
| | | | | | | CO2 | Disseminate the relevant skills while performing GDs, interviews, oral presentations with a focus on Non verbal communication. |
| | | | | | | CO3 | CO3 Prepare and exhibit oral presentation skills by using ICT.(Individual/Team) |
| | | | | | | CO4 | Organize proper life skills for their employability. |
| 21 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002192102 | Electrical Circuit Analysis-II | CO1 | Understand the measurement of three-phase power under balanced and unbalanced load condition. |
| | | | | | | CO2 | Analyze transient response of the electrical networks with DC and AC excitation. |
| | | | | | | CO3 | Determine the two port network parameters for different types of electrical networks. |
| | | | | | | CO4 | Realize the electrical equivalent network for a given network transfer functions |
| 22 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002192220 | Electrical Machines-II | CO1 | Understand the construction and operation of induction motors and synchronous machines |
| | | | | | | CO2 | Interpret the torque producing mechanism and testing methods of induction motors and regulation of synchronous machines |
| | | | | | | CO3 | Analyze various starting methods, phasor diagrams and equivalent circuit of induction motors and synchronous machines |
| | | | | | | CO4 | Evaluate the performance of induction motors and synchronous machines in real time applications |
| 23 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1004192203 | Analog Electronics | CO1 | Understand the concept of wave shaping circuits, switching characteristics of diode and transistor, PLL and Timer, the Logic gates and minimization of logic functions. |
| | | | | | | CO2 | Apply the knowledge of operational amplifiers with linear integrated circuits |
| | | | | | | CO3 | Analyze the active filters using op-amp and Boolean Alzebra expression |
| | | | | | | CO4 | Design circuits using operational amplifiers for various applications. |
| 24 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002192201 | Power Generation Engineering And Economics | CO1 | Understand the layout of Thermal,Wind, Hydro, Nuclear, Solar, Gas,Geothermal and OTEC power stations. |
| | | | | | | CO2 | Examine the operation of power plants and Fuel cells. |
| | | | | | | CO3 | Compare and contrast the energy scenario and tariffs in India and the World. |
| | | | | | | CO4 | Design a PV system for given load specifications. |

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| 25 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002192221 | Control Systems | CO1 | Derive the transfer function and state space models for electrical,mechanical and electro-mech systems |
| | | | | | | CO2 | Analyze the Transient & Steady State Performance of a different system. |
| | | | | | | CO3 | Determine the stability of different Linear Time invariant systems. |
| | | | | | | CO4 | Design lag,lead and lag-lead compensators for different systems to improve system performance. |
| 26 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1099192200 | Management Science | CO1 | Illustrate basic insights of management principles |
| | | | | | | CO2 | Summarize Production process, Quality control and Inventory techniques |
| | | | | | | CO3 | Apply Strategies and policies to functional areas |
| | | | | | | CO4 | AnalyzeContemporary management Practices |
| 27 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1000192130 | Environmental Science (Audit Course) | CO1 | Gain a higher level of personal involvement and interest in understanding and solving environmental resource problems and its sustainable conservation practices. |
| | | | | | | CO2 | Overall understanding of the relationship between man and ecosystem & biodiversity |
| | | | | | | CO3 | Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century |
| | | | | | | CO4 | Recognize the interconnectedness of human dependence on the earth's ecosystems and Influence their society in proper utilization of goods and services. |
| 28 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1020192100 | Employability Readiness Program-I (Open Elective-I) | CO1 | Acquire adequate writing skills that are needed in an organization |
| | | | | | | CO2 | Understand the core competencies to succeed in professional and personal life |
| | | | | | | CO3 | Solve various Basic Mathematics problems by following different methods and to perform well in various competitive exams and placement drives. |
| | | | | | | CO4 | Implement strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. |
| 29 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1020192101 | Public Administration | CO1 | Students will be able to understand definition, scope, approach and theories of public administration. |
| | | | | | | CO2 | Students will be able to identify the process and technique of decision making and also understand the concept of administrative behaviour and control. |
| | | | | | | CO3 | Students will be able tounderstand the process and technique of personnel and financial administration. |
| | | | | | | CO4 | Students will be able to understand and explain the major administrative techniques and values that public administration has and illustrate how those affect the work of government and also understand the process of administrative improvement. |
| | | | | | | CO5 | Students will be able to Discuss the tools that modern public administrators use to pursue public goals and public policy, along with the pros and cons of those tools. |

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| 30 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1020192102 | Foreign Linguistic - FRENCH | CO1 | Students have the adequate reading and speaking skills and will be able to express himself in French. |
| | | | | | | CO2 | Understand the grammar and use them in their personal and professional life. |
| | | | | | | CO3 | Students will be able to write proficiently in French. |
| | | | | | | CO4 | Studentswill be able to compare and contrast world culture and it will expand his knowledge about various culture. |
| 31 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002192170 | Mini Project – 1 EPICS/Societal relevant project | CO1 | Create an Industrial environment and culture within the institution. |
| | | | | | | CO2 | Provide students hands on experience on, troubleshooting, maintenance, fabrication, innovation, record keeping, documentation etc thereby enhancing the skill and competency part of technical education. |
| | | | | | | CO3 | Inculcate innovative thinking and thereby preparing students for main project. |
| | | | | | | CO4 | Set up self-maintenance cell within departments to ensure optimal usage of infrastructure facilities. |
| 32 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193100 | Power Transmission Engineering | CO1 | Compute inductance/capacitance of transmission lines and to understand the concepts of GMD/GMR. |
| | | | | | | CO2 | Analyze the performance of short, medium and long transmission lines. |
| | | | | | | CO3 | Summarize various factors related to charged transmission lines and underground cables. |
| | | | | | | CO4 | Estimate sag/tension of transmission lines, performance of line insulators. |
| 33 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193120 | Electrical Measurements and Instrumentation | CO1 | Describe the working principle and constructional features of different types of analog and digital measuring instrument for measurement of voltage, current, resistance, power, power factor, energy and magnetic measurements and various physical Quantities. |
| | | | | | | CO2 | Calibrate energy meter by suitable methods. |
| | | | | | | CO3 | Select suitable bridge for measurement of electrical parameters. |
| | | | | | | CO4 | Measure voltage, current, resistance by using potentiometer and frequency and phase difference between signals using CRO. |
| 34 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193121 | Power Electronics | CO1 | Understand the static and dynamic characteristics of various power semiconductor devices |
| | | | | | | CO2 | Interpret the operation of single phase and three phase rectifiers. |
| | | | | | | CO3 | Analyzethe operation of different types of DC-DC converters. |
| | | | | | | CO4 | Evaluate the performace of different types of AC-AC converters |

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| 35 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1004193102 | Digital Electronics | CO1 | Understand the Number Systems and their conversions and Describe about Logic Gates and logic families. |
| | | | | | | CO2 | Apply minimization techniques (boolean algebra and K-maps) to minimize logic expressions. |
| | | | | | | CO3 | Analyze Combinational Logic Circuits and Sequential logic circuits . |
| | | | | | | CO4 | Design Combinational Logic Circuits and Sequential logic circuits . |
| 36 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193150 | Digital Control Systems | CO1 | Understand the modelling of digital control Systems in frequency domain and time domain. |
| | | | | | | CO2 | Realize the z–transformations and their role in the mathematical analysis of different systems |
| | | | | | | CO3 | Analyse stability of the Linear Discrete systems |
| | | | | | | CO4 | Design the state feedback controller for Linear Discrete systems |
| 37 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193151 | Energy Audit Conservation and Management | CO1 | Understand principles of energy auditing, Energy management programme, purpose of energy conservation schemes and the operation of various energy instruments |
| | | | | | | CO2 | Identify different space heating and ventilation methods |
| | | | | | | CO3 | Solve and conclude the economic aspects of energy consumption |
| | | | | | | CO4 | Analyze power factor improvement methods and Distinguish the operating principle constructional features of energy efficient motors |
| 38 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193152 | Special Electrical Machines | CO1 | Understand the performance and principle of operation of stepper motor ,Switch d reluctance motor,PMDC,PM Materials and BLDC motors |
| | | | | | | CO2 | Implement different control and switching circuits for stepper motor,SRM,BLDC motors |
| | | | | | | CO3 | Analyse the theory of travelling magnetic field and identify the applications of linear motors in electric traction |
| | | | | | | CO4 | Design the constructional features of Switched reluctance motor |
| 39 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1012193161 | Fundamentals of Python Programming | CO1 | Understand operators, conditionals, functions,data structures and OOPs concepts of python. |
| | | | | | | CO2 | Install Python IDE and run python scripts. |
| | | | | | | CO3 | Import packages and handle Exceptions, files in Python. |
| | | | | | | CO4 | Develop programs using Numpy, Pandas,Matplotlib Libraries in Python. |
| 40 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1003193162 | Mechatronics | CO1 | Identification of different sensors, transducers, signal conditioning techniques |
| | | | | | | CO2 | Understanding and designing mechatronic motion logic control system and the key elements in its design |
| | | | | | | CO3 | Develop a PLC programming techniques with Microprocessor, ladder diagram for different logic Gates |
| | | | | | | CO4 | Design and Implementation of Micro Mechatronics System |

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| 41 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1004193160 | Signal Processing | CO1 | Design, simulate and realize different digital filters. |
| | | | | | | CO2 | Estimate the spectra of signals that are to be processed by discrete time system and to verify the performance of various spectrum estimation techniques |
| | | | | | | CO3 | Design multi rate digital signal processing system. |
| | | | | | | CO4 | Analyze architecture of DSP processor |
| 42 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1099193131 | IPR & Patents | CO1 | Interpret the various aspects of IPR |
| | | | | | | CO2 | Conclude importance of Copyrights, Trademarks & Trade Secrets. |
| | | | | | | CO3 | Obtain Patent Rights for New Innovations. |
| | | | | | | CO4 | Elaborate on Privacy Issues. |
| 43 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193180 | Technical Seminar | CO1 | Relate literature to formulate problem statements of technology and innovations in EEE. |
| | | | | | | CO2 | Develop documentation, presentation and communication skills for profession and personal growth following ethical values. |
| | | | | | | CO3 | Identify new directions in Multidisciplinary area |
| | | | | | | CO4 | Assess engineering solution and its applications for Real time problem |
| 44 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193200 | Power Electronics Controllers and Drives | CO1 | Understand the principles of Power electronics control of electric drives. |
| | | | | | | CO2 | Recognise the speed control of DC machines using DC DC converters |
| | | | | | | CO3 | Categorize the stator side and rotor side control of three phase AC drives. |
| | | | | | | CO4 | Describe VSI, PWM techniques to control the synchronous motor. |
| 45 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193201 | Power System Analysis | CO1 | Understand the per unit values of system and formulate Ybus&Zbus for a given power system network |
| | | | | | | CO2 | Apply various numerical methods to power system for determining power flows |
| | | | | | | CO3 | Compute symmetrical and asymmetrical fault calculations for a given power system network |
| | | | | | | CO4 | Analyze the steady state and transient stabilities of power system. |
| 46 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193202 | Utilization of Electrical Energy | CO1 | Identify a suitable motor for electric drives and industrial applications |
| | | | | | | CO2 | Describe various electrical heating, welding methods. |
| | | | | | | CO3 | Explain the basic terminology in illumination and compare the type of lamps |
| | | | | | | CO4 | Analyze the speed –time characteristics of different services of traction and calculate tractive effort, power and specific energy. |
| 47 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1004193222 | Microprocessors and Microcontrollers | CO1 | Understand the concepts of microcomputer system andexplore the architecture of microprocessors and microcontroller. |
| | | | | | | CO2 | Explore hardware configuration of 8086 and able to write assembly language program for basic arithmetic applications. |
| | | | | | | CO3 | Apply the knowledge of Interfacing memory and I/O devices with 8086 |
| | | | | | | CO4 | Developinterfacing circuit of different sensors and actuators with 8051. And apply the knowledge of programming for industrial applications. |
| 48 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193250 | Energy Storage Systems | CO1 | Discuss about electrical energy storage systems |
| | | | | | | CO2 | Examine about various electrochemical batteries |
| | | | | | | CO3 | Analyze the operation of Li-ion battery |
| | | | | | | CO4 | Assess the Electric Vehicles Charging Station |

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| 49 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193251 | Photovoltaic and Wind Energy System | CO1 | To analyze the characteristics of solar radiation, PV cells, modules and arrays |
| | | | | | | CO2 | Design of grid-connected PV schemes, Control of real and reactive power |
| | | | | | | CO3 | To analyze fixed speed and variable speed Wind Energy Conversion Systems. |
| | | | | | | CO4 | To analyze integration issues in PV-wind Systems. |
| 50 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193252 | Neural Networks and Fuzzy Logic | CO1 | Understand different architectures of ANN models of artificial neuron, learning strategies and algorithms |
| | | | | | | CO2 | Classify between classical and fuzzy sets. |
| | | | | | | CO3 | Use different modules of Fuzzy logic controller |
| | | | | | | CO4 | Apply Neural Networks and fuzzy logic for electrical engineering |
| 51 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1020193100 | Employability Readiness Program -II | CO1 | Students have the adequate writing skills that are needed in an organization and To perform well during Campus Drives and different Interviews |
| | | | | | | CO2 | Understand the core competencies to succeed in professional and personal life and Students will develop knowledge and experience with the use of the standard C programming language, |
| | | | | | | CO3 | Solve various Basic Mathematics problems by following different methods and analyses, summarize and present information in quantitative forms including table, graphs and formulas |
| | | | | | | CO4 | Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. |
| 52 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1019193252 | Introduction to Embedded System | CO1 | Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function |
| | | | | | | CO2 | Design the Embedded hardware by considering the hardware components required for an embedded system. |
| | | | | | | CO3 | Analyze the various embedded firmware design approaches on embedded environment to suit for desired application. |
| | | | | | | CO4 | integrate hardware and firmware of an embedded system and apply this knowledge to real time operating system. |
| 53 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1012193260 | Data Mining | CO1 | Understand data pre-processing and data visualization techniques |
| | | | | | | CO2 | Study algorithms for finding hidden and interesting patterns in data |
| | | | | | | CO3 | study and analyzevarious classification techniques. |
| | | | | | | CO4 | Apply various clustering techniques using tools in various algorithms |
| 54 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1005193260 | Introduction to Database Management Systems | CO1 | Understand ER model and Relational models |
| | | | | | | CO2 | Execute SQL queries for various conditions |
| | | | | | | CO3 | Analyze different indexing techniques, evaluate time complexity and its storage |
| | | | | | | CO4 | Create database and transactions |
| 55 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193260 | Electric Vehicles | CO1 | Distinguish the IC, EV's |
| | | | | | | CO2 | Analyse the Storage systems and Energy management system for EV's |
| | | | | | | CO3 | Design Electric Drive System |
| | | | | | | CO4 | Assess the performance of HEV's |

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| 56 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193261 | Fundamentals of Electrical Machines | CO1 | Understand the construction of the both DC and AC machines |
| | | | | | | CO2 | Distinguish the operation of DC and AC machines |
| | | | | | | CO3 | Calculate the performance parameters of DC motors, transformer |
| | | | | | | CO4 | Calculate the performance parameters of induction motor, Synchronous generator |
| 57 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1099192100 | Managerial Economics and Financial Analysis | CO1 | Evaluate the production theories and pricing policies of various enterprises |
| | | | | | | CO2 | Design and implement different structures of market covering how price is determined under different market structures. Also can able to take decisions using business cycles |
| | | | | | | CO3 | Analyze different forms of business organizations existing in the modern business and able to choose suitable form of business. |
| | | | | | | CO4 | Prepare financial statements and understand and implement the capital budgeting tools and techniques. |
| 58 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002194100 | Switchgear and Protection | CO1 | Understand the different types of Circuit Breakers and Relay in Power system |
| | | | | | | CO2 | Design the rating of CB and Relay to protect the Power System against the Faults |
| | | | | | | CO3 | Differentiate the grounded and ungrounded power system against over voltage Protection |
| 59 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002194120 | Progammable Logic Controllers & Applications | CO1 | Describe the PLC architecture and its I/O devices. |
| | | | | | | CO2 | Construct the Ladder diagram using contacts & coils. |
| | | | | | | CO3 | Apply various function blocks like timer, counter and program control & data handling instructions. |
| | | | | | | CO4 | Develop ladder logic for various industrial automation. |
| 60 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193260 | Electric Vehicles | CO1 | Distingish the IC , EV's |
| | | | | | | CO2 | Analize the Storage systems and Energy management system for EV's |
| | | | | | | CO3 | Design Electric Drive System |
| | | | | | | CO4 | Design of HEV's |
| 61 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002194150 | HVDC Transmission | CO1 | Compare HVDC and AC transmission system w.r.t. economical, technical and reliability aspects. |
| | | | | | | CO2 | Analyze the six pulse and twelve pulse converter configurations and describe converter control characteristics and MTDC systems. |
| | | | | | | CO3 | Describe various converter faults and protection methods in HVDC transmission system. |
| | | | | | | CO4 | Explain generation of harmonics and design suitable filters to eliminate them. |

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| 62 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002194151 | Optimization Techniques | CO1 | State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem. |
| | | | | | | CO2 | Apply classical optimization techniques to minimize or maximize a multi- variable objective function, without or with constraints, and arrive at an optimal solution. |
| | | | | | | CO3 | Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions. |
| | | | | | | CO4 | Apply gradient and non-gradient methods to nonlinear optimization |
| 63 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002194152 | Power Quality | CO1 | Understand different types of power quality problems with their source of generation and suggest preventive techniques. |
| | | | | | | CO2 | Evaluate the effects of harmonics on power system equipments and analyze the methods of controlling of harmonics. |
| | | | | | | CO3 | Analyze the sources , types and mitigation of over voltage issues and model of over voltage problem with computer software tools. |
| | | | | | | CO4 | Examine the power quality issues and operating conflicts when DG is interconnected to the grid. |
| 64 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002194153 | Microgrid and Smart Grid | CO1 | Explain topologies, interconnection issues of DGs and features of grid connected DG systems |
| | | | | | | CO2 | Design power converter topologies for DG applications and implement the control of Microgrid |
| | | | | | | CO3 | Interpret the concept of Resilient and Self- Healing Grid. |
| | | | | | | CO4 | AnalyzeMicro Grids (MGs) and Distributed Energy Resources (DERs) and alsoPQ issues with RES and also ICT for Smart Grid. |
| 65 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002194154 | Advanced Control Systems | CO1 | Model the different systems(electrical, mechanical and electro mechanical systems) in terms of various state models. |
| | | | | | | CO2 | Design the state feedback controller and observer for different systems. |
| | | | | | | CO3 | Interpret different nonlinearities and stability of the system |
| | | | | | | CO4 | Formulate and solve the different optimal control problems |
| 66 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1019193260 | Internet of Things | CO1 | To Understand the Architecture, protocols and applications of IoT. |
| | | | | | | CO2 | To Analyse the communication protocols and standards used in IoT |
| | | | | | | CO3 | To analyse and design the simple IoT applications to monitor or control IoT devices using simulation or hardware |
| | | | | | | CO4 | To implement the real time IoT applications. |

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| 67 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1005194160 | Introduction to Machine Learning | CO1 | Recognize the characteristics of machine learning that make it useful to real-world Problems |
| | | | | | | CO2 | Characterize machine learning algorithms as supervised, semi- supervised, and Unsupervised |
| | | | | | | CO3 | Be able to use support vector machine, regularized regression algorithms. |
| | | | | | | CO4 | Analyze the concept behind neural networks for learning non-linear functions. |
| 68 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1003193160 | Industrial Robotics | CO1 | Identify various robot configuration and components . |
| | | | | | | CO2 | Select appropriate actuators and sensors for a robot based on specific application |
| | | | | | | CO3 | Carry out kinematic and dynamic analysis for simple serial kinematic chains |
| | | | | | | CO4 | Perform trajectory planning for manipulator by avoiding obstacles. |
| 69 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002194160 | Programmable Logic Controllers | CO1 | Describe the PLC architecture and its I/O devices. |
| | | | | | | CO2 | Construct the Ladder diagram using contacts & coils. |
| | | | | | | CO3 | Apply various function blocks like timer, counter and program control & data handling instructions. |
| | | | | | | CO4 | Develop ladder logic for various industrial automation. |
| 70 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002193151 | Energy Audit Conservation and Management | CO1 | Understand principles of energy auditing, Energy management programme, purpose of energy conservation schemes and the operation of various energy instruments |
| | | | | | | CO2 | Identify different space heating and ventilation methods |
| | | | | | | CO3 | Solve and conclude the economic aspects of energy consumption |
| | | | | | | CO4 | Analyze power factor improvement methods and Distinguish the operating principle constructional features of energy efficient motors |
| 71 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002194250 | Electrical Distribution System | CO1 | Understand the Design of substations and distribution systems and Identifying the different factors of distribution systems CO2 Calculate voltage drops and power loss manually at each and every point in a line |
| | | | | | | CO2 | Calculate voltage drops and power loss manually at each and every point in a line |
| | | | | | | CO3 | Ilustrate the distribution system protection and its coordination schemes. |
| | | | | | | CO4 | Analyse the effect of compensation on power factor improvement and voltage control on distribution system. |

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| 72 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002194251 | Power System Operation & Control | CO1 | Outline various components of power system control. |
| | | | | | | CO2 | Apply algorithms to solve optimal scheduling of Hydrothermal Systems. |
| | | | | | | CO3 | Analyse single area and two area load frequency control. |
| | | | | | | CO4 | Distinguish performance of reactive power compensation in transmission systems. |
| 73 | VR19 | 02 | B.Tech-Electrical and Electronics Engineering | 1002194252 | Flexible Alternating Current Transmission System | CO1 | Compare voltage sourced converter (VSC) and current sourced converter (CSC). |
| | | | | | | CO2 | Apply the shunt and Series compensators for improving the transient stability , steady state stability and power oscillation damping's. |
| | | | | | | CO3 | Analyse control of SVC, STATCOM to compensate the transmission Parameters. |
| | | | | | | CO4 | Analyse the combined compensators used in enhancing the transmission line Performance. |

**VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY (A)**
**DEPARTMENT OF MECHANICAL ENGINEERING**
**VR19 B. Tech. Mechanical Engineering Course Outcomes**

| S.No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
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| 1 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000191100 | Mathematics-I | CO1 | Executing mean value theorems and evaluate maxima and minima of functions of two vari without constraints |
| | | | | | | CO2 | Apply the analytical methods to solve higher order linear differential equations. |
| | | | | | | CO3 | Evaluate of solution of Ordinary differential equations by using Laplace Transform techni |
| | | | | | | CO4 | Identify and solve partial differential equations. |
| 2 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000191120 | Engineering Physics | CO1 | Apply the knowledge of crystal systems and X-ray diffraction techniques. to identify the crystal structure of materials. |
| | | | | | | CO2 | Use the knowledge of acoustics and ultra sonics for characterization of acoustics design and non-destructive testing. |
| | | | | | | CO3 | Describe the wave phenomena and apply these concepts for construction of Lasers and optical fibers. |
| | | | | | | CO4 | Discuss the properties and synthesis techniques of nano materials. |
| 3 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000191121 | Technical English Communication | CO1 | Read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources, Social Awareness |
| | | | | | | CO2 | Read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources, Social Awareness |
| | | | | | | CO3 | Write effectively on various domains. |
| | | | | | | CO4 | Prepare and exhibit oral presentation skills by using ICT(Individual/Team) |
| 4 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003191100 | Engineering Mechanics | CO1 | Analyze the force systems for equilibrium conditions and able to draw free body diagram. |
| | | | | | | CO2 | Measure the frictional forces between contact surfaces. |
| | | | | | | CO3 | Determine Centroid, centre of gravity and second moment of area for composite sections. |
| | | | | | | CO4 | Analyse the motion and calculate trajectory characteristics. |
| 5 | VR19 | 03 | B.Tech-Mechanical Engineering | 1005191120 | Problem Solving and Programming Using C | CO1 | Write compile and debug Programs in C language |
| | | | | | | CO2 | Use operators, data types and write programs |
| | | | | | | CO3 | Select the best loop construct for a given problem |
| | | | | | | CO4 | Design and implement C programs |
| 6 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000191110 | Engineering Exploration | CO1 | Realize the purpose/Role of Engineer for solving social problems |
| | | | | | | CO2 | Learn to Design a component/system in an engineering way |
| | | | | | | CO3 | Learn to use mechanisms, Arduino, sensors, motors. |
| | | | | | | CO4 | Integrating different systems (mechanical/Electrical/computer) to work as a unit |

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| 7 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000191101 | Mathematics-II | CO1 | Solve approximate roots of an equation by using different numerical methods. |
| | | | | | | CO2 | Compute Interpolating polynomial for the given data. |
| | | | | | | CO3 | Compute Numerical Solution of ODE and Numerical Integration. |
| | | | | | | CO4 | Evaluate simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix. |
| 8 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000191200 | Transforms and Vector Calculus | CO1 | Formulate any period function in terms of sine and cosine |
| | | | | | | CO2 | Simplify a non periodic function as integral representation |
| | | | | | | CO3 | Apply multiple integration techniques in evaluating areas and volume bounded by region. |
| | | | | | | CO4 | Explain Gradient, divergence and curl operations in vector and scalar fields and apply Green's, Gauss and Stokes theorem as the generalisation of fundamental theorem of integral calculus. |
| 9 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000191220 | Engineering Chemistry | CO1 | Measure water quality parameters, corrosive environment and protection of pre metal |
| | | | | | | CO2 | Acquire the knowledge on advanced materials |
| | | | | | | CO3 | Inspect corrosive environments and protection of precious metal. |
| | | | | | | CO4 | Identify different polymers and their functionalities, acquire knowledge on vari Engineering materials |
| 10 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000191220 | Engineering Chemistry Lab | CO1 | Analyze& generate experimental skills. |
| | | | | | | CO2 | Enhance the thinking capabilities in the modern trends of engineering & technology. |
| | | | | | | CO3 | Learn and apply basic techniques used in chemistry laboratory for preparation of Organic compounds. |
| | | | | | | CO4 | Learn safety rules in the practice of laboratory investigation. |
| 11 | VR19 | 03 | B.Tech-Mechanical Engineering | 1002191220 | Basic Electrical and Electronics Engineering | CO1 | Apply Ohms Law and Kirchhoff's Laws and solve electrical circuits |
| | | | | | | CO2 | Describe the constructional features of DC machines, select suitable starters for DC motors estimate losses and efficiency of DC motor. |
| | | | | | | CO3 | Outline the constructional details and operating principles of AC machines and calculate the efficiency identify the characteristics, losses and efficiency of a three phase induction motor. |
| | | | | | | CO4 | Identify the structure, operation and characteristics and applications of measuring instruments and semiconductor devices. |
| 12 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003191101 | Engineering Drawing | CO1 | Understand the use of drawing instruments to construct the polygons and curves |
| | | | | | | CO2 | Develop the orthographic projections of points and lines. |
| | | | | | | CO3 | Apply the knowledge of orthographic projection to draw the views of both planes and solids. |
| | | | | | | CO4 | Analyse orthographic projections to develop isometric views and vice-versa |

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| 13 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003191210 | Engineering Workshop | CO1 | Understand different operations: Fitting, smithy, carpentry and Electrical wiring. |
| | | | | | | CO2 | Perform the fitting and carpentry operations. |
| | | | | | | CO3 | Develop simple objects like funnel, elbow etc. using sheet metal. |
| | | | | | | CO4 | Apply basic electrical engineering knowledge for house wiring practice like stair case wiring, series and parallel connections |
| 15 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000191130 | Constitution of India | CO1 | Have general knowledge and legal literacy and thereby to take up competitive examinations. |
| | | | | | | CO2 | Distinguish the power of state and central centralgovernment. |
| | | | | | | CO3 | Summarize theelection procedure in India before and after independence |
| | | | | | | CO4 | Association with the powers and functions of Municipalities, Panchayats and Cooperative Societies. |
| 16 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000192100 | Complex Variables & Statistical Methods | CO1 | Analyse the complex functions with reference to their analyticity. |
| | | | | | | CO2 | Analyse the complex integration by using Cauchy's integral formula and find Taylor's, Maclaurin's series and Laurent series expansion of complex function. |
| | | | | | | CO3 | Evaluate contour integrals by using Residue theorem andExplain the notation of random variables and Evaluate theexpected value and probability of random variables |
| | | | | | | CO4 | Evaluate the confidence levels and maximum errors forlarge and small samplings and Apply the concept of hypothesis testing for large and small samples in real. Lifesituations |
| 17 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003192120 | Materials Engineering | CO1 | Categorize the properties of metals/alloys with respect to crystal structure, grain size andunderstandthe necessity of alloying |
| | | | | | | CO2 | Explainthe concept of phase & phase diagram &understand the basic terminologies associated with metallurgy. |
| | | | | | | CO3 | Understand and suggest the heat treatment process & strengthening mechanisms. Significance of properties Vs microstructure. |
| | | | | | | CO4 | Identify the features and recommend appropriate materials viz. Ferrous alloys, non- ferrous alloys and composite materials for suitable application. |
| 18 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003192121 | Mechanics of Solids | CO1 | Identify the various stresses and strains that structural members experience under varied loading circumstances. |
| | | | | | | CO2 | Evaluate the shear force, bending moment, deflection of beams, and torsional stresses for different loading and support conditions. |
| | | | | | | CO3 | Assess societal issues by analysing the behaviour of various beams and columns under various loads and support conditions |
| | | | | | | CO4 | Analyze the stresses in thin and thick pressure vessels to arrive an optimum section to withstand the internal pressure. |

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| 19 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003192100 | Thermodynamics | CO1 | Acquire knowledge related to energy interactions in various fields of thermal engineering |
| | | | | | | CO2 | Importance of hidden governing laws behind various engineering systems specially used in power generation |
| | | | | | | CO3 | Outline the degree of disorder and its associated changes in the system as well as surroundings |
| | | | | | | CO4 | Evaluate the properties of air, pure substances and perfect gases with respect to temperature change. |
| 20 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003192122 | Fluid Mechanics & Fluid Machines | CO1 | Understand the properties of fluids and the applications of fluid mechanics |
| | | | | | | CO2 | Analyse property measuring devices |
| | | | | | | CO3 | Relate the concept of the boundary layer in resolving continuity, momentum, and energy equations on an activity basis |
| | | | | | | CO4 | Apply the principles of hydraulic pumpsfor domestic, agricultural and industrial applications |
| 21 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000192110 | Communication Skills Laboratory | CO1 | Examine introspect on individual strengths and weaknesses, and emerge as a balanced personality with improved self-awareness and self-worth |
| | | | | | | CO2 | Write a resume and gain the confidence to face an interview |
| | | | | | | CO3 | Develop the interpersonal skills to conduct himself/herself effectively in everyday professional and social contexts. |
| | | | | | | CO4 | Communicate in a group with confidence. |
| 22 | VR19 | 03 | B.Tech-Mechanical Engineering | 1005192170 | Mini Project – 1 Epics / Societal Relevant Project | CO1 | Understand the need of optimum design of a mechanical component or an assembly and Study the procedure to bring cost effective manufacturing process with proper material selection and technical procedure of planning the work. |
| | | | | | | CO2 | Apply the engineering knowledge, mathematics, design thinking and project management to develop a community project. |
| | | | | | | CO3 | Realize the significance of real time applications, energy management and environmental affects. |
| | | | | | | CO4 | Obtain the skill of data collection and technical report writing. |
| 23 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003192200 | Kinematics of Machinery | CO1 | Describe different kinematic inversions of four bar mechanisms and process of finding and applying velocity and accelerations to Agriculture and mechanical machine components. |
| | | | | | | CO2 | Produce different straight-line mechanisms and their applications in Automobile Engines and steering mechanism. |
| | | | | | | CO3 | Examine different cam and follower motions and their applications in IC engines. |
| | | | | | | CO4 | Solve different operating problems in transmission of power by belt, gear and gear trains. |

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| 24 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003192220 | Applied Thermodynamics- I | CO1 | Differentiate the basic combustion cycles and working of various IC engines along with engine systems and losses associated with engines. |
| | | | | | | CO2 | Learn the combustion physics involved in spark ignition and compression ignition engines and discuss the affects on environment |
| | | | | | | CO3 | Familiarize with the testing methods involved in determining and measurement of various performance parameters in SI and CI engines. |
| | | | | | | CO4 | Discuss the working principles of reciprocating air compressors and apply the principles in carrying out performance analysis. |
| 25 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003192221 | Manufacturing Process | CO1 | Understand the casting, welding, sheet metal and powder metallurgy processess. |
| | | | | | | CO2 | Analyze the force requirements for various bulk and sheet metal forming operations, |
| | | | | | | CO3 | Importance of powder metallurgy process and processing of plastics |
| 26 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003192222 | Machine Drawing | CO1 | Understand and apply the knowledge of machine drawing as a system of communication in which ideas are expressed clearly and all information fully conveyed |
| | | | | | | CO2 | Identify and classify the functionalities of various machine elements such as vices, bearings, screw jacks, shafts, fasteners, keys, cotters, pins and their assembly with respect to design Standardization. |
| | | | | | | CO3 | Construct an assembly drawing from the given part drawings of machine components. |
| | | | | | | CO4 | Improve the 2D model components of various machine components using AUTOCAD software. |
| 27 | VR19 | 03 | B.Tech-Mechanical Engineering | 1000192230 | Environmental Science | CO1 | Elucidate the natural resource & their importance for the sustenance of life and recognises the need to conserve natural resource |
| | | | | | | CO2 | Gives the broad view on the various attributes of pollution & and their impact & measure to reduce he pollution along with waste management |
| | | | | | | CO3 | Debates on social issues both rural and urban environment possible means to combat the challenges and trace the legislation of India towards sustainability |
| | | | | | | CO4 | Educates about Environmental Impact Assessment, Environmental Impact Statement & Environmental Audit |

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| 28 | VR19 | 03 | B.Tech-Mechanical Engineering | 1020192100 | Employability Readiness Program-1 | CO1 | Students have the adequate writing skills that are needed in an organization |
| | | | | | | CO2 | Understand the core competencies to succeed in professional and personal life |
| | | | | | | CO3 | Solve various Basic Mathematics problems by following different methods and to perform well in various competitive exams and placementdrives. |
| | | | | | | CO4 | Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. |
| 29 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193100 | Design of Machine Elements -I | CO1 | Apply the design procedure to engineering problems, including the consideration of technical and manufacturing constraints. |
| | | | | | | CO2 | Select suitable materials and significance of tolerances and fits in critical design applications. |
| | | | | | | CO3 | Design various mechanical elements as per design procedure for strength, stiffness and fatigue |
| | | | | | | CO4 | Identify the loads, the machine members subjected and calculate static and dynamic stresses to ensure safe design |
| 30 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193120 | Dynamics of Machinery | CO1 | Understand the Gyroscopic effect on sea , air and surface transport vehicles to establish safety. |
| | | | | | | CO2 | Analyze the torque and effect of friction in mechanical systems |
| | | | | | | CO3 | Examine the energy fluctuation in the flywheels and governors. |
| | | | | | | CO4 | Evaluate balancing of rotary and reciprocating masses to curb the failure |
| 31 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193101 | Applied Thermodynamics-II | CO1 | Understand the working principle of all components and their types in a steam power plant such as boilers, nozzles, turbines and condensers. |
| | | | | | | CO2 | Apply the conceptual theories in solving problems on all components employed in the steam power plant. |
| | | | | | | CO3 | Evaluate the performance of impulse and reaction turbines by applying the theory of compounding. |
| | | | | | | CO4 | Apply the principle of Newton's laws to Jet Propulsion systems such as gas turbines and rockets. |
| 32 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193121 | Manufacturing Technology | CO1 | Understand the metal cutting mechanisms and different machining processes. |
| | | | | | | CO2 | Select the suitable cutting tool material for various machining operations. |
| | | | | | | CO3 | Choose the type of machine based on the geometry of the final component. |
| | | | | | | CO4 | Importance of CNC machininigprocessesforinductrial needs. |

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| 33 | VR19 | 03 | B.Tech-Mechanical Engineering | 1005193161 | Data Structures | CO1 | Relate data structure concepts with real time applications. |
| | | | | | | CO2 | Apply linear and non-linear data structures by identifying the appropriate need. |
| | | | | | | CO3 | Analyze searching and sorting techniques for effective management of data |
| | | | | | | CO4 | Design and implement operations of linear and nonlinear data structures |
| 34 | VR19 | 03 | B.Tech-Mechanical Engineering | 1020193160 | Employability Readiness Program-II | CO1 | Write the professional documents that are needed in an organization and To perform well during Campus Drives and different Interviews |
| | | | | | | CO2 | Understand the core competencies to succeed in professional and personal life and Students will develop knowledge and experience with the use of the standard C programming language, |
| | | | | | | CO3 | Solve various Basic Mathematics problems by following different methods and analyses, summarize and present information in quantitative forms including table, graphs and formulas |
| | | | | | | CO4 | Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. |
| 35 | VR19 | 03 | B.Tech-Mechanical Engineering | 1001193161 | Industrial Waste and Waste Water Engineering | CO1 | Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation |
| | | | | | | CO2 | Impart knowledge on selection of treatment methods for industrial wastewater. |
| | | | | | | CO3 | Describe the common methods of treatment in different industries |
| | | | | | | CO4 | Explain operational problems of common effluent treatment plant |
| 36 | VR19 | 03 | B.Tech-Mechanical Engineering | 1002193160 | Solar Photovoltaic Energy Systems | CO1 | Explain the fundamentals of solar photovoltaic (PV) energy systems |
| | | | | | | CO2 | Analyze the characteristics of solar radiation, PV cells, modules and arrays |
| | | | | | | CO3 | Analyze the characteristics of solar radiation, PV cells, modules and arrays |
| | | | | | | CO4 | Analyze the system level issues related to PV energy systems |
| 37 | VR19 | 03 | B.Tech-Mechanical Engineering | 1099193130 | Professional Ethics and Human Values | CO1 | Understood the core values that shape the ethical behavior of an engineer |
| | | | | | | CO2 | Define importance of human values, harmony and ethical behavior in real life situations |
| | | | | | | CO3 | Apply the professional ethics and human values in real life situations. |
| | | | | | | CO4 | Understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature. |

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| 38 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193180 | Technical Seminar | CO1 | Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of computer science and engineering. |
| | | | | | | CO2 | Simulate and analyze the results reported in the chosen paper for seminar topic. |
| | | | | | | CO3 | Communicate effectively before the expert panel and develop technical reports. |
| | | | | | | CO4 | Respond to the queries raised by the evaluation committee and audience |
| 39 | VR19 | 03 | B.Tech-Mechanical Engineering | 1099192100 | Managerial Economics & Financial Analysis | CO1 | Describe the economic activities performed by the businessmen in the business for profit earning. Understand the significance of demand, its analysis, measurement of demand and its Forecasting |
| | | | | | | CO2 | Evaluate the production theories and pricing policies of various enterprises |
| | | | | | | CO3 | Design and implement different structures of market covering how price is determined under different market structures. Also can able to take decisions using business cycles |
| | | | | | | CO4 | Analyze different forms of business organizations existing in the modern business and able to choose suitable form of business. |
| 40 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193200 | Design of Machine Elements– II | CO1 | Understand the different types of machine elements behaviour under various working condition |
| | | | | | | CO2 | Design different types of machine elements like bearings, curved beams, power screws, differential and compounds screws. |
| | | | | | | CO3 | Design various power transmission elements such as belts, ropes, chains, pulleys, gear and machine tool elements of levers. |
| | | | | | | CO4 | Design various I.C engine parts like piston, connecting rod, crank shaft and cylinder. |
| 41 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193220 | Heat Transfer | CO1 | Understand basic concepts and governing equations of three modes of heat transfer |
| | | | | | | CO2 | Evaluate heat transfer coefficients for natural convection and forced convection. |
| | | | | | | CO3 | Design and develop a heat exchanger for the basic engineering applications by analyzing its performance |
| | | | | | | CO4 | Construct electrical analogy networks through basic principles of radiation to estimate the radiative heat exchange between the bodies. |

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| 42 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193221 | Instrumentation & Metrology | CO1 | Classify different instruments used for measurement of mechanical quantities |
| | | | | | | CO2 | Apply the various principles of working used in measurement systems |
| | | | | | | CO3 | Develop the measuring instruments for measurement of displacement,speed,temparature,pressure ,strain,linear and angular measurements |
| | | | | | | CO4 | Categorize the instruments for checking various elements of fits,surface roughness,screw thread and gear tooth parameters |
| 43 | VR19 | 03 | B.Tech-Mechanical Engineering | 1012193161 | Fundamentals of Python Programming | CO1 | Create the environment and run basic programs by make use of fundamental concepts |
| | | | | | | CO2 | Define and demonstrate the use of built-in data structures. |
| | | | | | | CO3 | Import packages to the current working environment and create user defined modules. |
| | | | | | | CO4 | Implement object-oriented concepts and handle exceptions and files |
| 44 | VR19 | 03 | B.Tech-Mechanical Engineering | 1005193160 | Programming in C++ | CO1 | Understand the basic terminology used in object-oriented programming |
| | | | | | | CO2 | Describe the object-oriented programming approach in connection with C++ |
| | | | | | | CO3 | Apply the concepts of object- oriented programming |
| | | | | | | CO4 | Apply virtual and pure virtual function & complex programming situations |
| 45 | VR19 | 03 | B.Tech-Mechanical Engineering | 1001193260 | Environmental Impact Assessment and Management | CO1 | Understand evaluate and create the basic concept of environmental impact assessment, environmental Impacts.Flow of EIA, types of |
| | | | | | | CO2 | Implement different methods in preparing an Environmental Impact Statement. |
| | | | | | | CO3 | Identify various mitigation measures that can be used. |
| | | | | | | CO4 | Choose methodology for identification of environmental impacts, environmental indices and indicator. |
| 46 | VR19 | 03 | B.Tech-Mechanical Engineering | 1002193260 | Electric Vehicles | CO1 | Understand the concepts and drive train configurations of electric drive vehicles. |
| | | | | | | CO2 | Describe different electric propulsion systems and energy storage devices |
| | | | | | | CO3 | Discuss the technology, design methodologies and control strategy of electric vehicles. |
| | | | | | | CO4 | Explain battery charger topologies for electric vehicles and discuss how the sizing of the drive system is done and energy management strategies used in electric. |

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| 47 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193250 | Condition Monitoring | CO1 | Understand the basic vibration problems and develop mathematical models using Mass, spring and damper concepts |
| | | | | | | CO2 | Evaluate the vibrating system response and analyse the behavior of vibrating systems |
| | | | | | | CO3 | Apply the knowledge of vibration analysis, thermography techniques, oil and wear debris analysis for identifying faults in machine components |
| | | | | | | CO4 | Analyse the defects in components using the knowledge of ultrasonic monitoring methods. |
| 48 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193251 | Gas Dynamics and Jet Propulsion | CO1 | Illustrate fluid flow systems. |
| | | | | | | CO2 | Analyze the isotropic flow of an ideal gas and its parameter. |
| | | | | | | CO3 | Explain frictional flow with heat transfer problems. |
| | | | | | | CO4 | Analyze the impact of heat transfer on flow parameters. |
| 49 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193160 | Industrial Robotics | CO1 | Understand the various robot configuration and components |
| | | | | | | CO2 | Choose appropriate actuators and sensors for a robot based on specific application |
| | | | | | | CO3 | Analyze the kinematic and dynamic analysis for simple serial kinematic chains |
| | | | | | | CO4 | Explain trajectory planning for a manipulator by avoiding obstacles. |
| 50 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003193252 | Operations Research | CO1 | Develop the different linear programming and assignment models for domain specific situations. |
| | | | | | | CO2 | Analyze the different transportation models. |
| | | | | | | CO3 | Design inventory and queueing theory models for optimal decisions. |
| | | | | | | CO4 | Apply optimal strategy to real time applications using dynamic programming and game theory. |

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| 52 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194100 | Finite Element Methods | CO1 | Understand the concepts of potential energy, variational methods and weighted residual methods. |
| | | | | | | CO2 | Identify the suitable FEA elements such as bars, truss, beams, constant strain triangle and isoparametric elements to create Finite Element Model with respect to the application |
| | | | | | | CO3 | Apply the suitable boundary conditions to the finite element model and solve the engineering problems |
| | | | | | | CO4 | Identify the finite element concept expands beyond the structural domain, for problems involving dynamics and heat transfer. |
| 53 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194101 | CAD/CAM | CO1 | Describe basic structure of CAD workstation, Memory types, input/output devices and display devices and computer graphics |
| | | | | | | CO2 | Apply knowledge of mathematical concept for geometry manipulation and modelling of curves, surfaces and solids |
| | | | | | | CO3 | Develop a programming for NC operations using various methods available |
| | | | | | | CO4 | Define the use of GT and CAPP for the product development. |
| 54 | VR19 | 03 | B.Tech-Mechanical Engineering | 1099192200 | Management Science | CO1 | Illustrate the insights of management principles. |
| | | | | | | CO2 | Summerize production process, quality control and inventory techniques. |
| | | | | | | CO3 | Identify strategies and policies to functional areas. |
| | | | | | | CO4 | Apply contemporary management polocies. |
| 55 | VR19 | 03 | B.Tech-Mechanical Engineering | 1005193261 | Artificial Intelligence | CO1 | Identify Methods in AI that may be suited to solve a given problem and Game Playing |
| | | | | | | CO2 | Make use of AI search algorithms and formalizations on real world problems |
| | | | | | | CO3 | Analyze the basic issues of different types of knowledge representation techniques to build intelligent system |
| | | | | | | CO4 | Apply probabilistic and fuzzy models to solve problems with uncertainty |
| 56 | VR19 | 03 | B.Tech-Mechanical Engineering | 1005194160 | Introduction to Machine Learning | CO1 | Appraise the importance of data and choose an appropriate algorithm to create a models |
| | | | | | | CO2 | Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervised |
| | | | | | | CO3 | Relate various machine learning and deep learning algorithms with real world applications |
| | | | | | | CO4 | Analyze how to evaluate models build from the sample datasets on web |

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| 57 | VR19 | 03 | B.Tech-Mechanical Engineering | 1001194160 | Disaster Management | CO1 | To know the basic concepts in Disasters and its triggering factures |
| | | | | | | CO2 | To understand stages of hydrological disaster |
| | | | | | | CO3 | To analysis the causes, effects, impacts and of hydrological, geological and coastal hazards. |
| | | | | | | CO4 | To understand the mitigation procedure of uncertain events |
| 58 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194150 | Unconventional Machining Processes | CO1 | Describe the need and importance of non-traditional machining methods and Apply the basic principle, equipment, process variables and mechanics of metal removal rate |
| | | | | | | CO2 | Design and analyze the surface finish and material removal in Chemical machining, electro chemical machining, electro chemical grinding, |
| | | | | | | C03 | Estimate the material removal rate and effect of process parameters in EDM, Electric discharge grinding and wire cut EDM process. |
| | | | | | | CO4 | Analyze the material removal rate in Electron Beam Machining and Laser Beam Machining processes and identify the effect of process parameters. |
| 59 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194151 | Mechatronics | CO1 | Understand the various mechatronics systems and their levels including the fundamental principles of different sensors and transducers |
| | | | | | | CO2 | Develop the model containing solid state electronic devices and make use of signal processing and conditioning theories |
| | | | | | | CO3 | Analyze various actuating systems to design mechatronic motion logic control system |
| | | | | | | CO4 | Assess PLC programming techniques and data acquisition systems for implementation of micro mechatronics systems |

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| 60 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194152 | Computational Fluid Dynamics | CO1 | Estimate the error for any two successive iterations for a simple laplacian equation using any numerical method |
| | | | | | | CO2 | Applying various numerical techniques to solve PDE's associated with governing equations applied in various engineering problems |
| | | | | | | CO3 | Determine momentum, energy, conservation laws and principles that are applied to conduction and convection problems using FDM approach |
| | | | | | | CO4 | Assess PLC programming techniques and data acquisition systems for implementation of micro mechatronics |
| 61 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194153 | Additive Manufacturing | CO1 | Recognize the development of Additive Manufacturing technology and opportunities for transforming a concept into product development. |
| | | | | | | CO2 | Apply the suitable rapid prototyping process for a given product |
| | | | | | | CO3 | Analyze STL file problems, find solution and repair |
| | | | | | | CO4 | Explore the applications of AM processes in various fields |
| 62 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194154 | Power Plant Engineering | CO1 | Understand the basic functional requirements of the elements of Steam power plant. |
| | | | | | | CO2 | Illustrate the working of various power plants viz Diesel, gas, hydro and nuclear. |
| | | | | | | CO3 | Analyze economics of power plants and interpret the performance of power plants based on load variations |
| | | | | | | CO4 | Elucidate the impact of power plant emissions on global warming and their preventive measures. |
| 63 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194155 | Refrigeration and Air Conditioning | CO1 | Acquire knowledge of various air refrigeration cycles and their analysis. |
| | | | | | | CO2 | Illustrate the performance improvement methods in VCR systems. |
| | | | | | | CO3 | Outline the refrigerant characteristics & components of the VCR system. |
| | | | | | | CO4 | Apply the working principles of vapour absorption & Discuss the various non-conventional methods of refrigeration. |
| 64 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194156 | Quality and Reliability Engineering | CO1 | Understand the concepts of quality and the fundamentals of science of quality engineering |
| | | | | | | CO2 | Draw and construct control charts |
| | | | | | | CO3 | Infer from sampling plans and determine the quality parameter levels |
| | | | | | | CO4 | Define a house of quality for a given scenario |
| 65 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194157 | Automobile Engineering | CO1 | Understand the different parts of the automobile |
| | | | | | | CO2 | Illustrate the working of various parts like engine, transmission, clutch, brakes, gearboxes, differential axle |
| | | | | | | CO3 | Describe the steering and the suspension system operation |
| | | | | | | CO4 | Identify the environmental implications of automobile emissions |

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| 66 | VR19 | 03 | B.Tech-Mechanical Engineering | 100319418 | Non-Destructive Evaluation | CO1 | Understand the basic knowledge of different NDE techniques which enables to carry out the various inspection. |
| | | | | | | CO2 | Relate the ultrasonic testing method in various applications with other methods. |
| | | | | | | CO3 | Aquire the knowledge of liquid penetrant, eddy current, magnetic particle testing methods and discuss the advantages and shortcomings |
| | | | | | | CO4 | differentiate various defect types and select appropriate testing method for better evaluation |
| 67 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194159 | Advanced Materials | CO1 | Understand the properties of constituents, classification of composites and their suitability for the structural applications. |
| | | | | | | CO2 | Categorize and process of different PMC, MMC & CCC with their applications |
| | | | | | | CO3 | Compute micromechanical analysis of Lamina. |
| | | | | | | CO4 | Compare Nano materials with bulk materials. |
| 68 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194101 | CAD/CAM Lab | CO1 | Apply of CAD computational analysisi tools to engineering desing and create a compute CAD documenttation for an engineering design |
| | | | | | | CO2 | Model complex shapes including freeform curves and surfaces |
| | | | | | | CO3 | Explain basic concepts of NCN programming machining |
| 69 | VR19 | 03 | B.Tech-Mechanical Engineering | 1005193260 | Introduction to Database Management Systems | CO1 | Identify the basic concepts and various data model used in database design, design ER model for a given problem and formulate SQL queries. |
| | | | | | | CO2 | Apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression from queries. |
| | | | | | | CO3 | Intrepret the use of normalization and functional dependency, indexing and hashing technique used in database design. |
| | | | | | | CO4 | Apply and relate the concept of transaction, concurrency control and recovery in database. |
| 70 | VR19 | 03 | B.Tech-Mechanical Engineering | 1005193102 | Operating Systems | CO1 | Categorize and assess various types of operating systems and execution of system calls at each phase. |
| | | | | | | CO2 | Analyze various process scheduling and memory management techniques to develop better solutions. |
| | | | | | | CO3 | Formulation of dead lock management, resource management techniques and IPC abstraction. |
| | | | | | | CO4 | Ability to perform tasks in Windows/ UNIX / Linux /Android and other environments. |

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| 71 | VR19 | 03 | B.Tech-Mechanical Engineering | 1005193161 | Fundamentals of Web Technology | CO1 | Create visualizations in accordance with static UI using HTML tags |
| | | | | | | CO2 | Apply intermediate and advanced web development practices |
| | | | | | | CO3 | Develop a fully functioning website using PHP and AJAX |
| | | | | | | CO4 | Analyze information from data and implement the same into web applications |
| 72 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194250 | Alternative Fuels | CO1 | CO1 Understand the current scenario of alternative fuels and reserve status of fossil fuels. |
| | | | | | | CO2 | CO2 Elucidate the important properties, production and storage of hydrogen and other gaseous fuels and address the implications during their use in IC engines. |
| | | | | | | CO3 | CO3 Evaluate the performance of clean propulsion technologies. |
| | | | | | | CO4 | Analyse the behavior of engines during the usage of alternative fuels |
| 73 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194251 | Green Engineering Systems | CO1 | Distinguish various types of solar thermal collectors |
| | | | | | | CO2 | Describe the working of a photovoltaic system and wind energy conversion system. |
| | | | | | | CO3 | Analyze the operation of fuel cells and biomass conversion technologies. |
| | | | | | | CO4 | Elaborate on ocean, geothermal, electrical and Mechanical systems |
| 74 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194252 | Design for Manufacture | CO1 | Understanding basic design rules for manufacturing and material selection. |
| | | | | | | CO2 | Applying the production process for ease of manufacturing. |
| | | | | | | CO3 | Analyze factors for selection of metals and alloys and relationship to manufacturing processes. |
| | | | | | | CO4 | Apply the concepts of design for manufacturing for product development |
| 75 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194253 | Production Planning And Control | CO1 | Understand the basics of workflow and becomes well acquainted with line balancing and mixed model production theories.. |
| | | | | | | CO2 | Comprehend the concepts of demand forecasting and the quantitative methods to meet the market demand. |
| | | | | | | CO3 | Differentiate EOQ, ABC and VED models. |
| | | | | | | CO4 | Apply the concepts of demand, supply to the production planning across all industries. |
| 76 | VR19 | 03 | B.Tech-Mechanical Engineering | 1003194270 | Main Project /Internship | CO1 | Analyze the entrepreneurship design and the business environment. |
| | | | | | | CO2 | Difine industrial policies. |
| | | | | | | CO3 | Explain the business preparation. |
| | | | | | | CO4 | Integrate the knowledge of various courses and their applications in industry. |

**VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY (A)**
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**
**VR19 B.Tech - Electronics and Communication Engineering Course Outcomes**

| S.No | Regulation | Programme | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
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| 1 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1000191100 | Mathematics-I | CO1 | Executing mean value theorems and evaluate maxima and minima of functions of two variables without constraints |
| | | | | | | CO2 | Apply the analytical methods to solve higher order linear differential equations. |
| | | | | | | CO3 | Evaluate of solution of Ordinary differential equations by using Laplace Transform technique. |
| | | | | | | CO4 | Identify and solve partial differential equations. |
| 2 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1000191123 | Applied Chemistry | CO1 | Identification of different polymers and their functionalities |
| | | | | | | CO2 | Determination of structure to many compounds and apply the basic knowledge in construction of cell and its applications |
| | | | | | | CO3 | Analysis of corrosive environments and protection of precious metal |
| | | | | | | CO4 | Adoption of different green methodologies and acquire knowledge on different advanced materials |
| 3 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1000191101 | Mathematics – II | CO1 | Solve approximate roots of an equation by using different numerical methods. |
| | | | | | | CO2 | Solve approximate roots of an equation by using different numerical methods. |
| | | | | | | CO3 | Computer Numerical Solution of ODE and Numerical Integration. |
| | | | | | | CO4 | Evaluate simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix. |
| 4 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1003191101 | Engineering Drawing | CO1 | Understand the use of drawing instruments to construct the polygons and curves |
| | | | | | | CO2 | Learn the principle of orthographic projections. Draw Orthographic projections of points, lines. |
| | | | | | | CO3 | Draw the various types of planes and solids its views in different Positions |
| | | | | | | CO4 | Draw isometric views of simple objects |
| 5 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005191120 | Problem Solving and Programming using C | CO1 | Interpret fundamentals of computers and convert flowcharts/algorithms to C Programs. |
| | | | | | | CO2 | Apply decision making and Iterative features of C Programming language effectively. |
| | | | | | | CO3 | Develop programs using modular techniques. |
| | | | | | | CO4 | Make use of user defined data types and implement them for various applications. |
| 6 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004191110 | Basic Electronic Workshop | CO1 | Demonstrate the passive and active components |
| | | | | | | CO2 | Analyze different Signal sources and measuring instruments |
| | | | | | | CO3 | Apply different types of relays in communication systems |
| | | | | | | CO4 | Apply different types of relays in communication systems |
| 7 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1000191130 | Constitution of India | CO1 | Have general knowledge and legal literacy and thereby to take up competitive examinations. |
| | | | | | | CO2 | Distinguish the power of state and central central governament |
| | | | | | | CO3 | Summarize theelection procedure in India before and after independence |
| | | | | | | CO4 | Association with the powers and functions of Municipalities, Panchayats and Cooperative Societies. |

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| 8 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1000191201 | Complex Variables and Vector Calculus | CO1 | Evaluate the analyticity of a complex function using CR equations and also construct an analytic function using Millan Thomson method |
| | | | | | | CO2 | Compute Line integrals using complex integrations. |
| | | | | | | CO3 | Expand the Taylor and Laurent series of simple functions and calculating residues by the nature of the singularities. |
| | | | | | | CO4 | Explain Gradient, divergence and curl operations in vector, scalar fields and apply Green's, Gauss and Stokes theorem as the generalisation of fundamental theorem of integral calculus. |
| | | | | | | CO5 | Evaluate the analyticity of a complex function using CR equations and also construct an analytic function using Millan Thomson method. |
| 9 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1002191201 | Network Analysis | CO1 | Apply the basic circuit analysis techniques, in DC circuits and To know the performance of the circuits |
| | | | | | | CO2 | Analyze steady state analysis of AC circuits |
| | | | | | | CO3 | Analyze steady state analysis of electrical circuits using theorems |
| | | | | | | CO4 | Gain the knowledge in characteristics of two port networks using parameters (Z, Y, ABCD, h ) and Analyze Transient state analysis of AC circuits |
| 10 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1000191222 | Wave Optics and Semiconductor Physics | CO1 | Discuss the wave phenomena of light and apply these principles to describe electromagnetic wave propagation. |
| | | | | | | CO2 | Apply the knowledge of basic quantum mechanics, to set up one-dimensional Schrodinger's wave equation |
| | | | | | | CO3 | Identify the importance of classical and quantum mechanical treatment of materials. |
| | | | | | | CO4 | Make use of the basic concepts of energy bands in crystalline solids to understand semiconductor physics. |
| 11 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005191221 | Data Structures | CO1 | Relate data structure concepts with real time applications. |
| | | | | | | CO2 | Apply linear and non linear data structures by identifying the appropriate need. |
| | | | | | | CO3 | Analyze searching and sorting techniques for effective management of data |
| | | | | | | CO4 | Design and implement operations of linear and nonlinear data structures |
| 12 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1000191121 | Technical English Communication | CO1 | Read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources, Social Awareness |
| | | | | | | CO2 | Analyze the functions of language and grammar in spoken and written forms. |
| | | | | | | CO3 | Write effectively on various domains. |
| | | | | | | CO4 | Prepare and exhibit oral presentation skills by using ICT(Individual/Team) |

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| 13 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1000191110 | Engineering Exploration | CO1 | Realize the purpose/Role of Engineer for solving social problems |
| | | | | | | CO2 | Learn to Design a component/system in an engineering way |
| | | | | | | CO3 | Learn to Design a component/system in an engineering way |
| | | | | | | CO4 | Integrating different systems (mechanical/Electrical/computer) to work as a unit |
| 14 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1000191131 | Extra Curricular Activities, Sports and Games (Audit Course) | CO1 | Learn new skills and Boost academic performance |
| | | | | | | CO2 | Broader social skills with improved time management |
| | | | | | | CO3 | Explore Interests and Create Broader Perspectives |
| | | | | | | CO4 | Participate in various co-curricular activities leading to their multifaceted personality development |
| 15 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1099192100 | Managerial Economics & Financial Analysis | CO1 | Analyze the Demand, Price and Cost. |
| | | | | | | CO2 | Identify the Nature of different markets to determine Price Output for different Business Units |
| | | | | | | CO3 | Interpret various forms of businesses |
| | | | | | | CO4 | Evaluate and Prepare investment project proposals and Financial Statements |
| 16 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004192120 | Electronic Devices & Circuits | CO1 | Analyze PN junctions in semiconductor devices under various conditions. |
| | | | | | | CO2 | Compare the construction, working principle of rectifiers with and without filters. |
| | | | | | | CO3 | Expalin the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations and understand the various biasing techniques for BJT and FET. |
| | | | | | | CO4 | Develop the stabilization concepts with expressions and perform the analysis of small signal low frequency transistor amplifier circuits using BJT. |
| 17 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004192100 | Signals and Systems | CO1 | Classify signals & systems for continues time, discrete time systems. |
| | | | | | | CO2 | Analyze continuous-time signals and systems using Fourier series, Fourier transform and Laplace transform. |
| | | | | | | CO3 | Explain sampling theorem to convert continuous-time signals to discrete-time signal and also apply z-transform to analyze discrete-time signals and systems |
| | | | | | | CO4 | Evaluate the relationships among the various representations of LTI systems and apply the Concepts of convolution, correlation, Energy and Power density spectrums to communication problems. |
| 18 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004192121 | Analog Communications | CO1 | Illustrate the need for modulation and differentiate various Analog modulation and demodulation techniques in terms of their spectral characteristics |
| | | | | | | CO2 | Interpret various functional blocks needed in the design of Radio Transmitters and Receivers |
| | | | | | | CO3 | Evaluate the performance characteristics of various Analog modulation schemes in the presence of Noise |
| | | | | | | CO4 | Implement simple analog systems for various modulation techniques |

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| 19 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004192101 | Switching Theory and Logic Design | CO1 | Solve numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray, and BCD. |
| | | | | | | CO2 | Evaluate functions using various types of minimizing algorithms like Boolean expressions using the theorems and postulates, Karnaugh map or tabulation method |
| | | | | | | CO3 | Design Various logic gates starting from simple ordinary gates to complex programmable devices and arrays. |
| | | | | | | CO4 | Design and analyze small combinational and sequential circuits and to use standard combinational and sequential functions/building blocks to build larger more complex circuits. |
| 20 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1020192100 | Employability Readiness Program-I | CO1 | Interpret and Participate in writing skills that are needed in an organization |
| | | | | | | CO2 | Recognize the need of core competencies to succeed in professional and personal life |
| | | | | | | CO3 | Solve various Basic Mathematics problems by following different methods and to perform well in various competitive exams and placementdrives. |
| | | | | | | CO4 | Apply shortcut methods to solve problems and confidently |
| 21 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1020192101 | Public Administration | CO1 | Interpret and manage in public governance. |
| | | | | | | CO2 | Participate in and contribute to the policy process. |
| | | | | | | CO3 | Analyze, think critically, solve problems, and make decisions. |
| | | | | | | CO4 | Articulate and apply a public service perspective. |
| 22 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1020192102 | Foreign Linguistic - French | CO1 | Construct simple sentences in French using syntax and grammar |
| | | | | | | CO2 | Pronounce and read French reasonably well. |
| | | | | | | CO3 | Demonstrate an elementary knowledge of French sentence structure through speaking and writing |
| | | | | | | CO4 | Apply basic spoken French and demonstrate understanding by writing and/or responding appropriately. |
| 23 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1000192130 | Environmental Science (Audit Course) | CO1 | Gain a higher level of personal involvement and interest in understanding and solving environmental resource problems and its conservation practices. |
| | | | | | | CO2 | Overall understanding of different types of natural resources and its conservation. |
| | | | | | | CO3 | Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century. |
| | | | | | | CO4 | Recognize the interconnectedness of human dependence on the earth's ecosystems and Influence their society in proper utilization of goods and services. Learn the management of environmental hazards and to mitigate disasters and have a clear understanding of environmental concerns and follow sustainable development practices. |
| 24 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004192220 | Analog Electronic Circuits – I | CO1 | Analyze the small signal high frequency transistor amplifier using BJT and FET. |
| | | | | | | CO2 | Design and analysis of multi stage amplifiers using BJT and analysis of different feedback amplifiers using BJT. |
| | | | | | | CO3 | Determine the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept. |
| | | | | | | CO4 | Classify the wave shaping circuits with different inputs. |

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| 25 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004192221 | Digital IC Applications | CO1 | Understand the structure of commercially available digital integrated circuit families |
| | | | | | | CO2 | Learn the IEEE Standard 1076 Hardware Description Language (VHDL) |
| | | | | | | CO3 | Model complex digital systems at several levels of abstractions, behavioral, structural, simulation, synthesis and rapid system prototyping |
| | | | | | | CO4 | Analyse and design basic digital circuits with combinatorial and sequential logic circuits using VHDL |
| 26 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004192200 | Introduction to Python Programming | CO1 | Enumerate different environments to install Python IDE and run basic Python scripts. |
| | | | | | | CO2 | Develop the programs using operators, functions, key Concepts of Object Oriented Programming in python. |
| | | | | | | CO3 | Access Python libraries from various online resources and import packages to the current working environment. |
| | | | | | | CO4 | Manipulate or Correlate the data through the accessing of files. |
| 27 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004192201 | Electromagnetic Waves and Transmission Lines | CO1 | Contrast the electric field and magnetic fields, analyze the Maxwell's Equations for static and time varying field |
| | | | | | | CO2 | Determine the EM wave equation and characterize the propagation of EM wave through conductor and dielectric medium. |
| | | | | | | CO3 | Designing the transmission line using the basic circuit elements and analyzing the different transmission parameters. |
| | | | | | | CO4 | Justification of smith chart to find the impedance mismatching and measurement of VSWR using VNA |
| 28 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004192202 | Random Variables & Stochastic Process | CO1 | Construct the Probability distribution and density functions for single and multiple random variables |
| | | | | | | CO2 | Identify different types of random variables and compute their statistical averages |
| | | | | | | CO3 | Characterize the random processes in the time and frequency domains. |
| | | | | | | CO4 | Analyze the LTI systems with random inputs |
| 29 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1000192110 | Communication Skills Lab | CO1 | ANALYZE the functiions of language and grammer in spoken and written forks with an emphasis on lsrw skills |
| | | | | | | CO2 | disseminate the relevant skills while performing gds , interviewa , oral presentatiions with a focus on non verbal commucation |
| | | | | | | CO3 | prepare and exhibit oral presentation skills by using ict |
| | | | | | | CO4 | organize proper life skills for their employability |
| 31 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004192270 | Mini Project-I (Epics/Societal Relevant Project) | CO1 | Classify the various social problems present in the world & they will be able to identify and select a community problem to develop a technological project. |
| | | | | | | CO2 | Illustrate the concepts of Design Thinking and Project management. Learn the technologies like Internet of Things, 3D Printing, Mobile App Creation, Thinker CAD, and Web page development. |
| | | | | | | CO3 | Apply the engineering knowledge, mathematics, design thinking and project management to develop a community project. |
| | | | | | | CO4 | Prepare professional work reports and develop presentation skills |

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| 32 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004193120 | Analog Electronic Circuits-2 | CO1 | Design & Analyze different types of differential amplifier circuits. |
| | | | | | | CO2 | Interpret the various linear and non-linear applications using operational amplifier. |
| | | | | | | CO3 | Analyze the different types of active filters and their design with operational amplifier & examine the functionalities of IC 555, PLL, VCO. |
| | | | | | | CO4 | Compare different types of ADC and DACs. |
| 33 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004193121 | Microprocessor and AVR Microcontroller | CO1 | Demonstrate the architecture of 8086 microprocessors. |
| | | | | | | CO2 | Make use of architecture and special functions of AVR microcontrollers. |
| | | | | | | CO3 | Develop programming for the AVR microcontrollers using C. |
| | | | | | | CO4 | Design and develop interface between I/O devices and AVR Microcontrollers. |
| 34 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005192221 | Database Management Systems | CO1 | Identify the basic concepts and various data model used in database design and formulate SQL queries. |
| | | | | | | CO2 | Interpret use of normalization in designing the database. |
| | | | | | | CO3 | Evaluate indexing and hashing techniques used in database design. |
| | | | | | | CO4 | Apply and relate the concept of transaction, concurrency control and recovery in the database. |
| 35 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004193100 | Antennas and Wave Propagation | CO1 | Illustrate the basic antenna parameters and Providing knowledge of different types of antenna. |
| | | | | | | CO2 | Design and Analyze antenna arrays. |
| | | | | | | CO3 | Analyze the importance of reasonent and non resonent antennas |
| | | | | | | CO4 | Compare different modes of wave propagation through ground wave, space wave and sky wave. |
| 36 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004193101 | Linear Control Systems | CO1 | Categorize different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form. |
| | | | | | | CO2 | Explain time domain analysis to predict and diagnose transient performance parameters of the system for standard input functions. |
| | | | | | | CO3 | Evaluate different types of analysis in frequency domain to explain the nature of stability of the system |
| | | | | | | CO4 | Determine the various kinds of compensator and also develop and analyze state space models for continuous time systems. |
| 37 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005193160 | Programming in C++ | CO1 | Relate the procedural and object oriented paradigm with real world entities |
| | | | | | | CO2 | Apply the concepts of function overloading,operator overloading ,virtual functions and polymorphism |
| | | | | | | CO3 | classify inheritance with understanding of early and late binding. |
| | | | | | | CO4 | solve the critical order problems using STL and Generic Programming |
| 38 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005193161 | Fundamentals of Web Technologies | CO1 | Describe different types of computer applications |
| | | | | | | CO2 | Describe the basic concepts of client server application and WWW |
| | | | | | | CO3 | Describe the basic concepts of HTML and CSS to design web pages and web site |
| | | | | | | CO4 | Analyze a given problem and apply requisite appropriate tools for designing interactive web applications. |

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| 39 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005193102 | Operating Systems | CO1 | Categorize and assess various types of operating systems and execution of system calls at each phase. |
| | | | | | | CO2 | Analyze various process scheduling and memory management techniques to develop better solutions. |
| | | | | | | CO3 | Formulation of dead lock management, resource management techniques and IPC abstraction. |
| | | | | | | CO4 | Ability to perform tasks in Windows/ UNIX / Linux /Android and other environments. |
| 40 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1003193160 | Industrial Robotics | CO1 | Identify various robot configuration and components |
| | | | | | | CO2 | Select appropriate actuators and sensors for a robot based on specific application |
| | | | | | | CO3 | Carry out kinematic and dynamic analysis for simple serial kinematic chains |
| | | | | | | CO4 | Perform trajectory planning for a manipulator by avoiding obstacles. |
| 41 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1099193130 | Universal human values and Professional ethics | CO1 | Discuss the importance of human values, harmony and ethical behavior in real life situations |
| | | | | | | CO2 | Describe the core values that shape the ethical behaviour of an engineer |
| | | | | | | CO3 | Recall basics of professional ethics and human values. |
| | | | | | | CO4 | Develop sustained happiness through identifying the essentials of human values and skills. |
| 42 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1099192200 | Management Science | CO1 | Illustrate basic insights of management principles |
| | | | | | | CO2 | Summarize Production process, Quality control and Inventory techniques |
| | | | | | | CO3 | Identify Strategies and policies to functional areas |
| | | | | | | CO4 | Apply Contemporary management Practices |
| 43 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004193220 | Digital Communications | CO1 | Compare different digital carrier modulation and demodulation schemes. |
| | | | | | | CO2 | Justify digital modulation techniques for optimal reception. |
| | | | | | | CO3 | Develop various errors correction and detection codes to digital data. |
| | | | | | | CO4 | Assess the error probability calculations for digital modulation techniques . |
| 44 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004193221 | VLSI Design | CO1 | Describe the fabrication process for MOS,CMOS and BICMOS technologies along with their electrical properties |
| | | | | | | CO2 | Outline the concepts of design rules during the layout design |
| | | | | | | CO3 | Model various scaling Models and factors and their effects on MOSFET parameters. |
| | | | | | | CO4 | Examine various design issues of VLSI Circuits and illustrate FPGA Design |
| 45 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1019193260 | Internet of Things | CO1 | Understand the Architecture, protocols and applications of IoT. |
| | | | | | | CO2 | Analyse the communication protocols and standards used in IoT |
| | | | | | | CO3 | Design the simple IoT applications to monitor or control IoT devices using simulation or hardware |
| | | | | | | CO4 | Implementation of the real time IoT applications. |
| 46 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004193250 | Digital Design Through Verilog Hdl | CO1 | Describe Verilog HDL and Design Digital circuits. |
| | | | | | | CO2 | Construct behavior model of digital circuits and Write RTL models of digital circuits. Verify behavior and RTL models |
| | | | | | | CO3 | Contrast standard Cell Libraries and FPGAs Synthesize RTL models to standard cell libraries and FPGAs. |
| | | | | | | CO4 | Implement RTL models on FPGAs and testing and verification |

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| 47 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004193251 | ARM Processors | CO1 | Demonstrate the architecture of ARM processors & LPC 2148 |
| | | | | | | CO2 | Develop programming for the specific application using LPC 2148 |
| | | | | | | CO3 | Make use of peripherals with microcontroller systems. |
| | | | | | | CO4 | Compare the specifications and suitability of I2C, SPI, RTC, WATCHDOG,TIMER, PWM generation blocks. |
| 48 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004193252 | Digital Image Processing | CO1 | Explain the fundamentals of gray scale and color image processing. |
| | | | | | | CO2 | Evaluate different transforms and compression methods on image for image processing applications. |
| | | | | | | CO3 | Solve the methods to extract information from the image in terms of spatial filtering, frequency filtering, restoration and segmentation. |
| | | | | | | CO4 | Examine the different techniques of color and multi resolution processing. |
| 49 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004193253 | Microwave Engineering | CO1 | Analyze the different modes of rectangular and circular waveguides |
| | | | | | | CO2 | Examine different microwave components and analyze different type of coupling mechanism |
| | | | | | | CO3 | Classify the principles of microwave tubes |
| | | | | | | CO4 | Distinguish the microwave solid state devices. |
| 50 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005193261 | Object Oriented Programming through Java | CO1 | Relate the procedural programming languages with object oriented paradigm |
| | | | | | | CO2 | Use Exception handling and multithreading mechanisms to create exception free and parallel real world applications |
| | | | | | | CO3 | Implement GUI for windows based applications with modern tools |
| | | | | | | CO4 | Design various layouts using swings and AWT |
| 51 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1002193260 | Electric Vehicles | CO1 | Explain the concepts and drivetrain configurations of electric drive vehicles. |
| | | | | | | CO2 | Describe different electric propulsion systems and energy storage devices |
| | | | | | | CO3 | Discuss the technology, design methodologies and control strategy of electric vehicles. |
| | | | | | | CO4 | Explain battery charger topologies for electric vehicles and discuss how the sizing of the drive system is done and energy management strategies used in electric vehicles. |
| 52 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005193251 | Artificial Intelligence | CO1 | Choose appropriate methods in AI that may be suited to solve a given problem and Game Playing. |
| | | | | | | CO2 | Make use of AI search algorithms and formalizations on real world problems. |
| | | | | | | CO3 | Analyze the basic issues of different types of knowledge representation techniques to build intelligent system. |
| | | | | | | CO4 | Apply probabilistic and fuzzy models to solve problems with uncertainty. |
| 53 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005193263 | Cryptography and Network Security | CO1 | Identify basic security attacks and services |
| | | | | | | CO2 | Analyze the strengths and weaknesses of various symmetric encryption algorithms. |
| | | | | | | CO3 | Apply the concepts of number theory and public key algorithms in cryptography |
| | | | | | | CO4 | Classify various cryptographic protocols, hash functions, digital signature schemes |

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| 54 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005193270 | Mini Project-II | CO1 | Implement electronic hardware by learning PCB artwork design, soldering techniques, testing and troubleshooting etc |
| | | | | | | CO2 | Apply new technologies & design techniques (platform, database,etc.) concerned for devising a solution for a given problem statement |
| | | | | | | CO3 | Work as an individual or in a team in development of technical projects. |
| | | | | | | CO4 | Develop project management skills (scheduling work, procuring parts, and documenting Expenditures and working within the confines of adeadline). |
| 55 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194120 | Digital Signal Processing | CO1 | Analyse the digital signals using various digital transforms DFT, FFT etc. |
| | | | | | | CO2 | Design and realize various digital filters for digital signal processing |
| | | | | | | CO3 | Evaluate the different multi rate digital signal processing systems. |
| | | | | | | CO4 | Illustrate the architecture of DSP processor |
| 56 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194150 | Radar Systems | CO1 | Interpret the factors affecting the radar performance using Radar Range Equation. |
| | | | | | | CO2 | Apply the principle of FMCW radar in the design of altimeter. |
| | | | | | | CO3 | Analyze the principle of each and every block of MTI and Tracking Radar |
| | | | | | | CO4 | Demonstrate the basic principle of Receiver and also extraction of signal in Noise |
| 57 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194151 | Bio Medical Signal Processing | CO1 | Understand the characteristics of different biomedical signals |
| | | | | | | CO2 | Analyse the nature of biomedical signals and related concepts. |
| | | | | | | CO3 | Apply filters and averaging techniques to remove noise and extract features of biomedical signals, |
| | | | | | | CO4 | Analyse the biomedical signals using wavelet transform |
| 58 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194152 | Digital IC Design | CO1 | Illustrate the concepi of MOS Design. |
| | | | | | | CO2 | Design and analysis of Combinational and Sequential MOS Circuits. |
| | | | | | | CO3 | Elaborate the Digital IC Design to Different Applications. |
| 59 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194153 | Micro Electro Mechanical Systems (Mems) | CO1 | Interpret the role of miniaturization in microelectronic devices and scaling rules of MEMS. |
| | | | | | | CO2 | Articulate the techniques for building the microelectronic devices on various types materials. |
| | | | | | | CO3 | Deduce the Microsystems technology for technical feasibility. |
| | | | | | | CO4 | Design MEMS based micro systems and micro devices, |
| 60 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194154 | Satellite Communications | CO1 | Examine orbital mechanics and launch methodologies |
| | | | | | | CO2 | Analyze link power budget for satellites |
| | | | | | | CO3 | Design satellite access techniques |
| | | | | | | CO4 | Analyze the earth station technology and constellation of NGSO |
| 61 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194155 | Pattern Recognition | CO1 | Explain fundamentals of pattern recognition. |
| | | | | | | CO2 | Evaluate concepts various nonparametric techniques for pattern recognition. |
| | | | | | | CO3 | Solve various discrete hidden markov models for pattern recognition. |
| | | | | | | CO4 | Examine the concepts of continuous hidden markov models for pattern recognition |

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| 62 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194156 | Low Power VLSI Design | CO1 | Examine the sources of power dissipation and learn methods to reduce power dissipation |
| | | | | | | CO2 | Analyze different low-Power Design Approaches and learn to estimate Power dissipation |
| | | | | | | CO3 | Assess different Low-Voltage Low-Power Adders and Multipliers. |
| | | | | | | CO4 | Design Low-Voltage Low-Power Memories and compare the performance between different memories |
| 63 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194157 | CPLD & FPGA Architectures and Applications | CO1 | Illustrate the features and concepts of PLDs, CPLD, FPGAs and its applications. |
| | | | | | | CO2 | Analyze different types of Complex Programmable Logic Devices (CPLDs) |
| | | | | | | CO3 | Understand different types of FPGAs and its Architectures with Applications. |
| | | | | | | CO4 | FSM and different FSM techniques and different case studies. |
| 64 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194158 | Cellular Mobile Communications | CO1 | Summarize the concepts, characteristics, principles and operation of cellular systems. |
| | | | | | | CO2 | Apply Concepts, principles to Co-channel interference Reduction factor, Desired C/I, directional Antenna system and Cell splitting. |
| | | | | | | CO3 | Analyse the concepts on cell coverage of signal and traffic, frequency and channel assignment strategies. |
| | | | | | | CO4 | Infer the concepts of handoff and discuss architecture of GSM |
| 65 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194159 | Introduction to 5G Technology | CO1 | Summarize the evolution of 5G, system concepts and spectrum challenges |
| | | | | | | CO2 | Illustrate and explain the 5G functional and physical architecture and its requirements Explain the architecture, Beamforming and hardware technologies for mm wave communications |
| | | | | | | CO3 | Describe and explain the requirements and fundamental techniques for MTC and D2D Communication |
| | | | | | | CO4 | Categorize various radio access technologies for 5G networks |
| 66 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194190 | VLSI Testing & Testability | CO1 | Summarize the basic faults that occur in digital systems |
| | | | | | | CO2 | outline procedures to generate test patterns for detecting single stuck faults in combinational and sequential circuits. |
| | | | | | | CO3 | Design for testability techniques with improved fault coverage |
| | | | | | | CO4 | Asses different approaches for introducing BIST into logic circuits, memories and embedded cores. |
| 67 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194191 | Optical Communications | CO1 | Properties of optical fiber that affect the performance of a communication link and types of fiber materials with their properties and the losses occur in fibers. |
| | | | | | | CO2 | Working of semiconductor lasers, and differentiate between direct modulation and external electro-optic modulation. |
| | | | | | | CO3 | Analyze the operation of LEDs, laser diodes, and PIN photo detectors (spectral properties, bandwidth, and circuits) and apply in optical systems |
| | | | | | | CO4 | Analyze and design optical communication and fiber optic sensor systems. |

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| 68 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005194160 | Introduction to Machine Learning | CO1 | Appraise the importance of data and choose an appropriate algorithm to create a models |
| | | | | | | CO2 | Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervised |
| | | | | | | CO3 | Relate various machine learning and deep learning algorithms with real world applications |
| | | | | | | CO4 | Analyze how to evaluate models build from the sample datasets on web |
| 69 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005193254 | Advanced Databases | CO1 | choose appropriate techniques to Store data in the files |
| | | | | | | CO2 | Apply and analyze various terms related to transaction management in centralized and distributed database |
| | | | | | | CO3 | Examine the issues related to multimedia and mobile database performance |
| | | | | | | CO4 | Analyze and Implement the concept of object- relational database in development of various real time software |
| 70 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005193253 | Fundamentals of Block Chain Technologies | CO1 | Choose functional/operational aspects of crypto currency echo system |
| | | | | | | CO2 | Make use of emerging abstract models for Block chain technology |
| | | | | | | CO3 | Identify major research challenges and technical gaps existing in between theory and practice in cryptocurrency domain. |
| | | | | | | CO4 | Build fundamental characteristics of block chain using bit coin. |
| 71 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1005193253 | Software Project Management | CO1 | Examine how software development life cycle models can impact the software deliverables |
| | | | | | | CO2 | Conduct activities necessary to successfully complete and close the Software projects |
| | | | | | | CO3 | Estimate the effort required for a software project development and identify software risks |
| | | | | | | CO4 | Develop the skills for tracking and controlling software deliverables |
| 72 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194180 | Technical Seminar | CO1 | Relate literature to formulate problem statements of technology and innovations |
| | | | | | | CO2 | Develop documentation, presentation and communication skills for prefession and personal growth following ethical values |
| | | | | | | CO3 | Identify new directions in Multidisciplinary area |
| | | | | | | CO4 | Assess engineering solution and its applications for Real time problem |
| 73 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194240 | Professional Elective-5 / Moocs* | CO1 | Take Part openly on a global scale, with global learners and Instructor |
| | | | | | | CO2 | Develop high quality learning using multimedia platform |
| | | | | | | CO3 | Self assessment of their performance and learning process. |
| | | | | | | CO4 | Adapt a life long learning culture and updating the knowledge according with emerging trends |
| 74 | VR19 | 04 | B.Tech-Electronics and communication Engineering | 1004194270 | Main Project /Internship | CO1 | Apply knowledge of Electronics and communication engineering fundamentals to solve the complex Engineering problems |
| | | | | | | CO2 | Design prototypes and solutions to solve the specific needs related with public health, safety, society and environment leading to sustainable development following ethical values |
| | | | | | | CO3 | Adapt appropriate techniques, resources and modern engineering tools during the implementation of project |
| | | | | | | CO4 | Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and self-development |

| VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY (A) | | | | | | | |
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| DEPARTMENT OF COMPUTER SCIENCE ENGINEERING | | | | | | | |
| | VR19 B.Tech. Comupter Science and Engineering Course Outcomes | | | | | | |
| S.No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
| 1 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1000191100 | Mathematics-I | CO1 | Executing mean value theorems and evaluate maxima and minima of functions of two variables without constraints |
| | | | | | | CO2 | Apply the analytical methods to solve higher order linear differential equations. |
| | | | | | | CO3 | Evaluate of solution of Ordinary differential equations by using Laplace Transform technique. |
| | | | | | | CO4 | Identify and solve partial differential equations. |
| 2 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1000191123 | Applied Chemistry | CO1 | Identification of different polymers and their functionalities |
| | | | | | | CO2 | Determination of structure to many compounds and apply the basic knowledge in construction of cell and its applications |
| | | | | | | CO3 | Analysis of corrosive environments and protection of precious metal |
| | | | | | | CO4 | Adoption of different green methodologies and acquire knowledge on different advanced materials |
| 3 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1003191101 | Engineering Drawing | CO1 | Understand the use of drawing instruments to construct the polygons and curves |
| | | | | | | CO2 | Learn the principle of orthographic projections. Draw Orthographic projections of points, lines. |
| | | | | | | CO3 | Draw the various types of planes and solids its views in different Positions |
| | | | | | | CO4 | Draw isometric views of simple objects |
| 4 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1000191121 | Technical English Communication | CO1 | Read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources, Social Awareness |
| | | | | | | CO2 | Analyze the functions of language and grammar in spoken and written forms. |
| | | | | | | CO3 | Write effectively on various domains. |
| | | | | | | CO4 | Prepare and exhibit oral presentation skills by using ICT(Individual/Team) |
| 5 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005191120 | Problem Solving & Programming using C | CO1 | Interpret fundamentals of computers and convert flowcharts/algorithms to C Programs, compile and debug programs |
| | | | | | | CO2 | Apply decision making and Iterative feature of C Programming language effectively. |
| | | | | | | CO3 | Design and implement programs to analyze the different pointer applications |
| | | | | | | CO4 | Apply structures and unions and Implement file Operations in C programming for any given problem |
| 6 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1000191110 | Engineering Exploration | CO1 | Realize the purpose/Role of Engineer for solving social problems |
| | | | | | | CO2 | Learn to Design a component/system in an engineering way |
| | | | | | | CO3 | Learn to use mechanisms, Arduino, sensors, motors. |
| | | | | | | CO4 | To develop prototype machine using Arduino Uno board. |
| 7 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1000191131 | Extra Curricular Activities, Sports and Games | CO1 | Learn new skills and Boost academic performance |
| | | | | | | CO2 | Broader social skills with improved time management |
| | | | | | | CO3 | Explore Interests and Create Broader Perspectives |
| | | | | | | CO4 | Participate in various co-curricular activities leading to their multifaceted personality development |

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| 8 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1000191202 | Probability and Statistics | CO1 | Elucidate the notion of random variable and evaluate the expected value and probability of random variables. |
| | | | | | | CO2 | Apply Binomial, Poisson, Normal, gamma and weibull distributions for real data to compute probabilities, theoretical frequencies. |
| | | | | | | CO3 | Evaluate the confidence levels and maximum error for large and small samples. |
| | | | | | | CO4 | Analyze the concept of hypothesis testing for large and small samples in real life situations to draw the inferences and estimate the goodness of fit. |
| 9 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1000191221 | Applied Physics | CO1 | Describe the wave phenomena and apply these concepts for construction of Lasers and optical fibers. |
| | | | | | | CO2 | Apply the knowledge of basic quantum mechanics, to set up one-dimensional Schrodinger's wave equation |
| | | | | | | CO3 | Identify the importance of classical and quantum mechanical treatment of materials |
| | | | | | | CO4 | Make use of the basic concepts of energy bands in crystalline solids to understand semiconductor physics. |
| 10 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005191222 | OOPS through C++ | CO1 | Understand the basic terminology used in object-oriented programming |
| | | | | | | CO2 | Describe the object-oriented programming approach in connection with C++ |
| | | | | | | CO3 | Apply the concepts of object- oriented programming |
| | | | | | | CO4 | Apply virtual and pure virtual function & complex programming situations |
| 11 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1004191200 | Basic Electronics | CO1 | Explain the basic concepts of Circuit theory, semiconductor physics and analyze the PN junction diode and special purpose diode. |
| | | | | | | CO2 | Explain the BJT and FET and analyze various biasing techniques for BJT. |
| | | | | | | CO3 | Design electronic circuit using logic gates |
| | | | | | | CO4 | Analyze basics working and principle of sensors |
| 12 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1000191101 | Mathematics-II | CO1 | Solve approximate roots of an equation by using different numerical methods. |
| | | | | | | CO2 | Compute Interpolating polynomial for the given data. |
| | | | | | | CO3 | Constitute Numerical Solution of ODE and Numerical Integration. |
| | | | | | | CO4 | Evaluate simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix. |
| 13 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005191210 | IT Workshop | CO1 | Assemble and disassemble components of a PC |
| | | | | | | CO2 | utilize MS-office package |
| | | | | | | CO3 | make use of linux operating system commands |
| | | | | | | CO4 | intrepret cyber threats. |
| 14 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1000191130 | Constitution of India | CO1 | Have general knowledge and legal literacy and thereby to take up competitive examinations. |
| | | | | | | CO2 | Distinguish the power of state and central government. |
| | | | | | | CO3 | Summarize the election procedure in India before and after independence |
| | | | | | | CO4 | Association with the powers and functions of Municipalities, Panchayats and Cooperative Societies. |

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| 15 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005192100 | Discrete Mathematical Structures | CO1 | Demonstrate skills in solving counting problem |
| | | | | | | CO2 | Develop reasoning skills using Mathematical Logic concepts. |
| | | | | | | CO3 | Identify the solutions for various problems using recurrence relations |
| | | | | | | CO4 | Apply concepts of graph theory for a given problem. |
| 16 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005192101 | Digital Logic Design | CO1 | Apply the principles of number system, binary codes and Boolean algebra to minimize logic expression |
| | | | | | | CO2 | Analyze functionality of digital circuits |
| | | | | | | CO3 | Design efficient combinational logic circuit implementations from functional description of digital systems |
| | | | | | | CO4 | Demonstrate the use of sequential circuits and storage elements in real-time applications. |
| 17 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005192120 | Data Structures through C | CO1 | Apply the concept of linear and non-linear data structures to various applications |
| | | | | | | CO2 | Analyze and implement operations on linked lists and demonstrate their applications. |
| | | | | | | CO3 | implement stacks and queues using arrays and linked lists |
| | | | | | | CO4 | develop programs by nonlinear data structures such as tree and graphs |
| 18 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005192121 | Java Programming | CO1 | Relate the procedural and object paradigm, with real world entities |
| | | | | | | CO2 | Use Exception handling and multithreading mechanisms to create efficient software application |
| | | | | | | CO3 | Implement GUI Applications with modern tools |
| | | | | | | CO4 | Design various layouts along with applet usage |
| 19 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1099192100 | Managerial Economics and Financial Analysis | CO1 | Analyze the Demand, Price and Cost. |
| | | | | | | CO2 | Identify the Nature of different markets to determine Price Output for different Business Units |
| | | | | | | CO3 | Understand Various Business Forms |
| | | | | | | CO4 | Evaluate investment project proposals |
| 20 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1020192100 | Employability Readiness Program | CO1 | Students have the adequate writing skills that are needed in an organization |
| | | | | | | CO2 | Understand the core competencies to succeed in professional and personal life |
| | | | | | | CO3 | Solve various Basic Mathematics problems by following different methods and to perform well in various competitive exams and placementdrives. |
| | | | | | | CO4 | Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. |
| 21 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1020192101 | Public Administration | CO1 | Understand definition, scope, approach and theories of public administration. |
| | | | | | | CO2 | Identify the process and technique of decision making and also understand the concept of administrative behaviour and control. |
| | | | | | | CO3 | Understand the process and technique of personnel and financial administration. |
| | | | | | | CO4 | Discuss the tools that modern public administrators use to pursue public goals and public policy, along with the pros and cons of those tools. |
| 22 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1020192102 | Foreign Linguistic - French | CO1 | Students have the adequate reading and speaking skills and will be able to express himself in French. |
| | | | | | | CO2 | Understand the grammar and use them in their personal and professional life. |
| | | | | | | CO3 | Students will be able to write proficiently in French. |
| | | | | | | CO4 | Studentswill be able to compare and contrast world culture and it will expand his knowledge about various culture. |

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| 23 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005192170 | Mini Project – 1 EPICS/Societal relevant project | CO1 | Understand the various social problems present in the world & they will be able to identify and select a community problem to develop a technological project. |
| | | | | | | CO2 | Learn the concepts of Design Thinking and Project management. |
| | | | | | | CO3 | Learn the technologies like Internet of Things, 3D Printing, Mobile App Creation, Thinker CAD, and Web page development. |
| | | | | | | CO4 | Apply the engineering knowledge, mathematics, design thinking and project management to develop a community project. |
| 24 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1000192130 | Environmental Science (Audit Course) | CO1 | Gain a higher level of personal involvement and interest in understanding and solving environmental resource problems and its sustainable conservation practices. |
| | | | | | | CO2 | Overall understanding of the relationship between man and ecosystem & biodiversity |
| | | | | | | CO3 | Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century |
| | | | | | | CO4 | Recognize the interconnectedness of human dependence on the earth's ecosystems and Influence their society in proper utilization of goods and services. |
| 25 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005192220 | Advance Data Structures | CO1 | To understand graph representations, Minimum Spanning Trees and traversals |
| | | | | | | CO2 | Understand dictionaries, hashing mechanism which supports faster retrieval. |
| | | | | | | CO3 | Implement heaps, queues and their operations, B Trees and B+ Trees |
| | | | | | | CO4 | Illustration of tries which share some properties of table look up, various issues related to the design of file structures |
| 26 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005192200 | Computer Organization and Architecture | CO1 | To conceptualize the basics of organizational and architectural issues of a digital computer and to perform computer arithmetic operations. |
| | | | | | | CO2 | To analyze performance issues in processor and can calculate the effective address of an operand by addressing modes. |
| | | | | | | CO3 | Ability to design memory organization that uses banks for different word size operations to understand the concept of cache memory techniques |
| | | | | | | CO4 | Understand the concept of Input / Output organization. |
| 27 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005192221 | Database Management Systems | CO1 | Describe ER model and normalization f or database design. |
| | | | | | | CO2 | Create, maintain and manipulate a relational database using SQL |
| | | | | | | CO3 | Design and build database system for a given real world problem |
| | | | | | | CO4 | Examine issues in data storage and query processing and can formulate appropriate solutions. |
| 28 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005192202 | Formal Languages and Automata Theory | CO1 | Employ finite state machines to solve problems in computing |
| | | | | | | CO2 | Classify machines by their power to recognize languages |
| | | | | | | CO3 | To Design PDA for solving computational Problems |
| | | | | | | CO4 | To design Turing Machine for arithmetic Operations |

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| 29 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005192201 | Software Engineering | CO1 | Apply the appropriate process models for the application development of SDLC |
| | | | | | | CO2 | Understand the phases of SDLC from requirement gathering phase to design phase via Analysis Phase |
| | | | | | | CO3 | Analyzing the strategies for coding and testing phase in Software product development |
| | | | | | | CO4 | Apply the knowledge about estimation and maintenance of software systems and modeling the software project by using CASE tools |
| 30 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1000192110 | Communication Skills Lab | CO1 | Analyze the functions of language and grammar in spoken and written forms with an emphasis on LSRW Skills. |
| | | | | | | CO2 | Disseminate the relevant skills while performing GDs, interviews, oral presentations with a focus on Non verbal communication. |
| | | | | | | CO3 | Prepare and exhibit oral presentation skills by using ICT.(Individual/Team) |
| | | | | | | CO4 | Organize proper life skills for their employability. |
| 31 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193120 | Web Technologies | CO1 | Understand HTML tags to design static web pages |
| | | | | | | CO2 | Describe the basic concepts of Java Scripts to design dynamic web pages |
| | | | | | | CO3 | Familiarize the concepts of PHP and AJAX |
| | | | | | | CO4 | Analyze a given problem and apply requisite appropriate tools for designing dynamic and interactive web applications |
| 32 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193100 | Design and Analysis of Algorithms | CO1 | Able to analyze the performance of an algorithm in terms of time and space. |
| | | | | | | CO2 | Give an intuition on how to find a solution to large problems by dividing them into smaller sub problems. |
| | | | | | | CO3 | Identifying which designing technique can be used to solve a particular problem. |
| | | | | | | CO4 | Able to analyse the complexities between naïve and parallel algorithms |
| 33 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193101 | Data Warehousing and Data Mining | CO1 | Understand the concepts of data warehouse and data mining |
| | | | | | | CO2 | Use data pre processing techniques to build data warehouse. |
| | | | | | | CO3 | Analyze transaction databases for association rules. |
| | | | | | | CO4 | Understand the details of different algorithms made available by popular commercial data mining software and Solve real data mining problems by using the right tools to find interesting patterns. |
| 34 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193102 | Operating Systems | CO1 | Summarize various concepts of Operating Systems |
| | | | | | | CO2 | Implement and Apply Process Scheduling Algorithms |
| | | | | | | CO3 | Illustrate concepts of Paging, Segmentation and Apply Concurrency, Deadlock Mechanisms in real world. |
| | | | | | | CO4 | Analyze the concepts of file systems in operating systems |
| 35 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193150 | Programming Essentials in Python | CO1 | Develop essential programming skills in computer programming concepts like data types, containers |
| | | | | | | CO2 | Apply the basics of programming in the Python language |
| | | | | | | CO3 | Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming. |
| | | | | | | CO4 | Solve coding tasks related OOPS, and Multithreading |
| 36 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193151 | Industrial Oriented Python Programming | CO1 | Develop essential programming skills in computer programming concepts like data types, containers |
| | | | | | | CO2 | Apply the basics of programming in the Python language |
| | | | | | | CO3 | Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming. |
| | | | | | | CO4 | Solve coding tasks related OOPS, and Multithreading |

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| 37 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193152 | Unix and Shell Programming | CO1 | Explain the architecture and features of UNIX Operating System and differentiate it from other Operating Systems |
| | | | | | | CO2 | Demonstrate UNIX commands for file handling and process control |
| | | | | | | CO3 | Build Regular expressions for pattern matching and apply them to various filters for a specific task |
| | | | | | | CO4 | Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem |
| 38 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193153 | Computer Graphics | CO1 | To understand the various computer graphics hardware and display technologies |
| | | | | | | CO2 | To implement various type of scan conversion algorithms, line and polygon clipping algorithms. |
| | | | | | | CO3 | To apply different 2D and 3D transformation techniques & viewing technologies to real world problems |
| | | | | | | CO4 | To understand the basic concepts of gaming theory |
| 39 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193154 | Advanced Computer Architecture | CO1 | Understand Computational models and Computer Architectures. |
| | | | | | | CO2 | Design and Analyze parallel computer models. |
| | | | | | | CO3 | Understand Scalable Architectures, Pipelining. |
| | | | | | | CO4 | Understand Superscalar processors and multiprocessors. |
| 40 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1001193161 | Industrial Waste and Waste Water Engineering | CO1 | Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation |
| | | | | | | CO2 | Impart knowledge on selection of treatment methods for industrial wastewater. |
| | | | | | | CO3 | Describe the common methods of treatment in different industries |
| | | | | | | CO4 | Explain operational problems of common effluent treatment plant |
| 41 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1002193151 | Energy Audit Conservation and Management | CO1 | Apply principles of energy auditing and propose energy conservation schemes. |
| | | | | | | CO2 | Demonstrate principle and organizing energy management program. |
| | | | | | | CO3 | Analyze power factor improvement methods, and Demonstrate the operating principle of energy efficient motors. |
| | | | | | | CO4 | To Analyze about space heating and ventilation methods and demonstrate the operation of various energy instruments. |
| | | | | | | CO5 | Analyze and compute the economic aspects of energy consumption |
| 42 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1003193161 | Industrial Robotics | CO1 | Identify various robot configuration and components |
| | | | | | | CO2 | Select appropriate actuators and sensors for a robot based on specific application |
| | | | | | | CO3 | Carry out kinematic and dynamic analysis for simple serial kinematic chains |
| | | | | | | CO4 | Perform trajectory planning for a manipulator by avoiding obstacles. |
| 43 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1004193161 | Data Communications | CO1 | Understand the network layer architecture |
| | | | | | | CO2 | Learn about various digital modulation techniques. |
| | | | | | | CO3 | Apply various errors correction and detection codes to digital data. |
| | | | | | | CO4 | Learn about electromagnetic properties., |
| 44 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193110 | Python Programming Lab | CO1 | Develop essential programming skills in computer programming concepts like data types, containers |
| | | | | | | CO2 | Apply the basics of programming in the Python language |
| | | | | | | CO3 | Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming. |
| | | | | | | CO4 | Solve coding tasks related OOPS, and Multithreading |

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| 45 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1099193130 | Professional Ethics & Human Values | CO1 | Relate ethical human values |
| | | | | | | CO2 | Apply engineering knowledge for society |
| | | | | | | CO3 | Elaborate responsibility for safety & risk |
| | | | | | | CO4 | Outline the various current global issues |
| 46 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1012193120 | Computer Networks | CO1 | Define Network and its components and Illustrate the functionality of OSI and TCP/IP reference models. |
| | | | | | | CO2 | Compare different network layer protocols and Demonstrate various types of routing technique |
| | | | | | | CO3 | Evaluate Architecture for Application layer protocols. |
| | | | | | | CO4 | Choose appropriate protocol for desired communication service. |
| 47 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193200 | Compiler Design | CO1 | Acquire knowledge in different phases and passes of Compiler |
| | | | | | | CO2 | Understand Parser and its types i.e. Top-down and Bottom-up parsers. |
| | | | | | | CO3 | Construct LL, SLR, CLR and LALR parse table. |
| | | | | | | CO4 | Syntax directed translation, synthesized and inherited attributes and analyze techniques for code optimization |
| 48 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1099192200 | Management Science | CO1 | Illustrate basic insights of management principles |
| | | | | | | CO2 | Summarize Production process, Quality control and Inventory techniques |
| | | | | | | CO3 | Indentify Strategies and policies to functional areas |
| | | | | | | CO4 | Apply Contemporary management Practices |
| 49 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193250 | Basics of Mathematics for Security | CO1 | Understand the concepts and formula of number theory |
| | | | | | | CO2 | Understand the basic concepts of various algebraic structures and theorems like Euler's theorem for designing security algorithm. |
| | | | | | | CO3 | Describe the basic concepts of coding theory which will be useful for data compression, information hiding |
| | | | | | | CO4 | Illustrate various pseudorandom number generation used for designing security protocols and for its analysis. |
| 50 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193251 | Artificial Intelligence | CO1 | The student should be able to identify problems that are amenable to solution by AI methods. |
| | | | | | | CO2 | The student should be able to identify appropriate AI methods to solve a given problem. |
| | | | | | | CO3 | Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming). |
| | | | | | | CO4 | The student should have knowledge in expert system |
| 51 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193252 | Concurrent and Parallel Programming | CO1 | Compare parallel programs and sequential programs |
| | | | | | | CO2 | Classify parallel computing platforms. |
| | | | | | | CO3 | List the parallel algorithm models. |
| | | | | | | CO4 | Write shared memory parallel programs with openMP |
| 52 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193253 | Software Project Management | CO1 | To understand the basic concepts and issues of software project management |
| | | | | | | CO2 | To conduct activities necessary to successfully complete and close the Software projects |
| | | | | | | CO3 | To implement the project plans through managing people, communications and change |
| | | | | | | CO4 | To develop the skills for tracking and controlling software deliverables |

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| 53 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193254 | Advanced Databases | CO1 | Store data in the files and to implement indexing schemes for the fast retrieval of data |
| | | | | | | CO2 | Implement query complier, planner and executor |
| | | | | | | CO3 | Implement concurrency control protocols for transaction processing system |
| | | | | | | CO4 | Recovery techniques for recovering from transaction. |
| 54 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1001193260 | Environmental Impact Assessment and Management | CO1 | Understand evaluate and create the basic concept of environmental impact assessment, Flow of EIA, Types of environmental Impacts |
| | | | | | | CO2 | Implement different methods in preparing an Environmental Impact Statement. |
| | | | | | | CO3 | Identify various mitigation measures that can be used. |
| | | | | | | CO4 | Select methodology for identification of environmental impacts, environmental indices and indicators |
| 55 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1004193161 | Signal Processing | CO1 | Design, simulate and realize different digital filters. |
| | | | | | | CO2 | Estimate the spectra of signals that are to be processed by discrete time system and to verify the performance of various spectrum estimation techniques |
| | | | | | | CO3 | Design multi rate digital signal processing system. |
| | | | | | | CO4 | Understand the architecture of DSP processor |
| 56 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1019193261 | Embedded System Design | CO1 | Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function |
| | | | | | | CO2 | Design the Embedded hardware by considering the hardware components required for an embedded system |
| | | | | | | CO3 | Analyze the various embedded firmware design approaches on embedded environment to suit for desired application |
| | | | | | | CO4 | Understand how to integrate hardware and firmware of an embedded system and apply this knowledge to real time operating system. |
| 57 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1020193200 | Employability Readiness Program-III | CO1 | Students have the adequate writing skills that are needed in an organization and To perform well during Campus Drives and different Interviews |
| | | | | | | CO2 | Understand the core competencies to succeed in professional and personal life and Students will develop knowledge and experience with the use of the standard C programming language, |
| | | | | | | CO3 | Solve various Basic Mathematics problems by following different methods and analyses, summarize and present information in quantitative forms including table, graphs and formulas |
| | | | | | | CO4 | Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. |
| 58 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193210 | Algorithms Lab | CO1 | The ability to understand, analyze and develop computer programs in the areas related to algorithms. |
| | | | | | | CO2 | To find an algorithm to solve the problem and prove that the algorithm solves the problem correctly. |
| | | | | | | CO3 | To understand the mathematical criterion for deciding whether an algorithm is efficient. |

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| 59 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193270 | Mini Project-II | CO1 | apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint. |
| | | | | | | CO2 | Ability to perform individually as well as in a team, accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success |
| | | | | | | CO3 | Ability to use formal and informal communications with team members and guide, make presentations and prepare technical document. |
| | | | | | | CO4 | Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems |
| 60 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193280 | Technical Seminar | CO1 | Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of computer science and engineering. |
| | | | | | | CO2 | Simulate and analyze the results reported in the chosen paper for seminar topic. |
| | | | | | | CO3 | Communicate effectively before the expert panel and develop technical reports. |
| | | | | | | CO4 | Respond to the queries raised by the evaluation committee and audience |
| 61 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193280 | Machine Learning | CO1 | Appraise the importance of data and choose an appropriate algorithm to create a models |
| | | | | | | CO2 | Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervised |
| | | | | | | CO3 | Relate various machine learning and deep learning algorithms with real world applications |
| | | | | | | CO4 | Analyze how to evaluate models build from the sample datasets on web |
| 62 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005194100 | Big Data Analytics | CO1 | Relate different aspects of BigData in accordance with various big data applications |
| | | | | | | CO2 | Catergorize various dimensions of BigData (5V's) and its sources in real time |
| | | | | | | CO3 | Make use of recent tools related to Hadoop, Spark and MapReduce etc |
| | | | | | | CO4 | Analyze the different aspects of cluster computing with real world applications |
| 63 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005194121 | Object Oriented Analysis and Design using UML | CO1 | Build solutions to the complex problems using object oriented approach |
| | | | | | | CO2 | Identify classes and responsibilities of the problem domain |
| | | | | | | CO3 | Apply UML tools for various case studies |
| | | | | | | CO4 | Represent classes, objects, responsibilities and states using UML notations. |
| 64 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005193263 | Cryptography and Network Security (PE-III) | CO1 | Identify basic security attacks and services |
| | | | | | | CO2 | Analyze the strengths and weaknesses of various symmetric encryption algorithms. |
| | | | | | | CO3 | Apply the concepts of number theory and public key algorithms in cryptography |
| | | | | | | CO4 | Classify various cryptographic protocols, hash functions, digital signature schemes |
| 65 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005194150 | Artificial Neural Networks (PE-III) | CO1 | Demonstrate ANN structure and activation Functions. |
| | | | | | | CO2 | Define foundations and learning mechanisms and state-space concepts. |
| | | | | | | CO3 | Explain multi-layer feed forward networks and Back propagation algorithms. |
| | | | | | | CO4 | Analyze Radial Basis Function Networks and SVMs |

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| 66 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005194151 | Advanced Computer Networks (PE-III) | CO1 | Enumerate the layers of the OSI model and TCP/IP model. Explain the function(s) of each layer. Ability to understand about different architectures network. |
| | | | | | | CO2 | Identify the different types of network devices and their functions within a network. |
| | | | | | | CO3 | build the skills to inter work with sub netting, routing mechanisms and transport layer protocols. |
| | | | | | | CO4 | Select appropriate quality of service mechanism for a given computer network |
| 67 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005194152 | Software Architecture and Design Patterns (PE-III) | CO1 | Create, classify and build the software architecture |
| | | | | | | CO2 | Illustrate and evaluate the architecture structures |
| | | | | | | CO3 | Design creational and structural patterns |
| | | | | | | CO4 | Outline behavioural pattern and case study in uitlizing the software architectural structures |
| 68 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005194153 | Distributed Systems (PE-III) | CO1 | Illustrate the basic elements and concepts related to distributed system technologies |
| | | | | | | CO2 | List the characteristics of distributed systems for designing architectural models |
| | | | | | | CO3 | Enumerate the features and applications of important standard protocols which are used in the distributed system |
| | | | | | | CO4 | Interpret inter-process communication in a distributed system |
| 69 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005194154 | Cloud Computing (PE-IV) | CO1 | apply the knowledge of cloud technology to infer the working principles of cloud computing |
| | | | | | | CO2 | analyse cloud services extended by various cloud providers to build a cloud |
| | | | | | | CO3 | Identify emerging cloud programming paradigms and its software environments |
| | | | | | | CO4 | Design and develop the backup strategies for cloud data by pridcting the future risks |
| 70 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005194155 | Pattern Recognition (PE-IV) | CO1 | elucidate the parametric and linear models of classification in domain specific applications |
| | | | | | | CO2 | Compare and parameterize different learning algorithms in NLP applications |
| | | | | | | CO3 | Develop machine independent and unsupervised learning techniques. |
| | | | | | | CO4 | Apply pattern recognition techniques to real world problems such as documentation analysis and recognition |
| 71 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005194156 | Mobile Adhoc Networks (PE-IV) | CO1 | develop new applications in Manets and WSN. |
| | | | | | | CO2 | enable the student to understand the need for security and the challenges and also the role of cross layer design in enhancing the network performance |
| | | | | | | CO3 | develop algorithms/protocols for Manets and WSN. |
| | | | | | | CO4 | examine new technical issue related to these new thrust areas and come up with a solution(s). |
| 72 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005194157 | Software Testing Methodologies | CO1 | Figure out practical solutions to the problems for various applications |
| | | | | | | CO2 | formulate and analyze test cases for given problem domain |
| | | | | | | CO3 | manage test plans and test models for projects from inception to transition |
| | | | | | | CO4 | find out the implementation of different strategies to replace errors |
| 73 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1005194158 | Mern Stack Technologies (PE-IV) | CO1 | make use of HTML5, CSS, JavaScript and Bootstrap. |
| | | | | | | CO2 | Implement a Fast, unopinionated, minimalist web framework for Node.js using Express |
| | | | | | | CO3 | Develop MongoDB-a schema-less (document-oriented) NoSQL database |
| | | | | | | CO4 | Build and deploy a social network with Node.js |

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| 74 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1001194160 | Disaster Management (OE-IV) | CO1 | know the basic concepts in Disasters and its triggering factures |
| | | | | | | CO2 | understand stages of hydrological disaster |
| | | | | | | CO3 | analysis the causes, effects, impacts and of hydrological, geological and coastal hazards. |
| | | | | | | CO4 | understand the mitigation procedure of uncertain events |
| 75 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1003193252 | Operations Research (OE-IV) | CO1 | formulate and solve various practical problems in manufacturing and service organizations. |
| | | | | | | CO2 | solve the allocation models |
| | | | | | | CO3 | perform iterations in the Transportation, assignment, game, inventory problems |
| | | | | | | CO4 | perform iterations in the replacement, sequencing, queuing problems |
| 76 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1004193252 | Digital Image Processing (OE-IV) | CO1 | Explain the fundamentals of gray scale and color image processing. |
| | | | | | | CO2 | Apply different compression methods on image for image processing applications. |
| | | | | | | CO3 | Solve the methods to extract information from the image in terms of spatial filtering, frequency filtering, restoration and segmentation. |
| | | | | | | CO4 | Examine the different techniques of color and multi resolution processing. |
| 77 | VR19 | 05 | B.Tech-Computer Science and Engineering | 1019103260 | Internet of Things (OE-IV) | CO1 | Understand the Architecture, protocols and applications of IoT. |
| | | | | | | CO2 | Analyse the communication protocols and standards used in IoT |
| | | | | | | CO3 | design the simple IoT applications to monitor or control IoT devices using simulation or hardware |
| | | | | | | CO4 | implement the real time IoT applications. |

VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY (A)
DEPARTMENT OF INFORMATION TECHNOLOGY
VR19 B. Tech - Information Technology Course Outcomes

| S. No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 1 | VR19 | 12 | B.Tech-Information Technology | 1000191100 | Mathematics-I | CO1 | Executing mean value theorems and evaluate maxima and minima of functions of two variables without constraints |
| | | | | | | CO2 | Apply the analytical methods to solve higher order linear differential equations. |
| | | | | | | CO3 | Evaluate of solution of Ordinary differential equations by using Laplace Transform technique. |
| | | | | | | CO4 | Identify and solve partial differential equations. |
| 2 | VR19 | 12 | B.Tech-Information Technology | 1000191123 | Applied Chemistry | CO1 | Identification of different polymers and their functionalities |
| | | | | | | CO2 | Determination of structure to many compounds and apply the basic knowledge in construction of cell and its applications |
| | | | | | | CO3 | Analysis of corrosive environments and protection of precious metal |
| | | | | | | CO4 | Adoption of different green methodologies and acquire knowledge on different advanced materials |
| 3 | VR19 | 12 | B.Tech-Information Technology | 1003191101 | Engineering Drawing | CO1 | Understand the use of drawing instruments to construct the polygons and curves |
| | | | | | | CO2 | Learn the principle of orthographic projections. Draw Orthographic projections of points, lines. |
| | | | | | | CO3 | Draw the various types of planes and solids its views in different Positions |
| | | | | | | CO4 | Draw isometric views of simple objects |
| 4 | VR19 | 12 | B.Tech-Information Technology | 1005191120 | Problem Solving & Programming using C | CO1 | Interpret fundamentals of computers and convert flowcharts/algorithms to C Programs, compile and debug programs |
| | | | | | | CO2 | Apply decision making and Iterative feature of C Programming language effectively. |
| | | | | | | CO3 | Design and implement programs to analyze the different pointer applications |
| | | | | | | CO4 | Apply structures and unions and Implement file Operations in C programming for any given problem |
| 5 | VR19 | 12 | B.Tech-Information Technology | 1000191121 | Technical English Communication | CO1 | Read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources, Social Awareness |
| | | | | | | CO2 | Analyze the functions of language and grammar in spoken and written forms. |
| | | | | | | CO3 | Write effectively on various domains. |
| | | | | | | CO4 | Prepare and exhibit oral presentation skills by using ICT(Individual/Team) |
| 6 | VR19 | 12 | B.Tech-Information Technology | 1000191110 | Engineering Exploration | CO1 | Realize the purpose/Role of Engineer for solving social problems |
| | | | | | | CO2 | Learn to Design a component/system in an engineering way |
| | | | | | | CO3 | Learn to use mechanisms, Arduino, sensors, motors. |
| | | | | | | CO4 | Integrating different systems (mechanical/Electrical/computer) to work as a unit |
| 8 | VR19 | 12 | B.Tech-Information Technology | 1000191101 | Mathematics-II | CO1 | Solve approximate roots of an equation by using different numerical methods. |
| | | | | | | CO2 | Compute Interpolating polynomial for the given data. |
| | | | | | | CO3 | Constitute Numerical Solution of ODE and Numerical Integration. |
| | | | | | | CO4 | Evaluate simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix. |
| 9 | VR19 | 12 | B.Tech-Information Technology | 1000191221 | Applied Physics | CO1 | describe the wave phenomen and applu thesse concepts for construction of lasers and optical fibers . |
| | | | | | | CO2 | apply the knowledge of basic quantum mechanics, to set up one deimesional schrodingers wave equation . |
| | | | | | | CO3 | identify the importance if classical and quantum . |
| | | | | | | CO4 | male use od the basic comcepts of energy bands in ctystalline solids to undestsnd semiconductor physics . |

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| 10 | VR19 | 12 | B.Tech-Information Technology | 1005191222 | OOPS through C++ | CO1 | Relate the procedural and object paradigm, streams, classes, functions, data and objects with real world entities. |
| | | | | | | CO2 | Apply the concepts of function overloading, operator overloading ,virtual functions and polymorphism. |
| | | | | | | CO3 | classify inheritance with understanding of early and late binding. |
| | | | | | | CO4 | solve the critical order problems using STL and Generic Programming. |
| 11 | VR19 | 12 | B.Tech-Information Technology | 1004191200 | Basic Electronics | CO1 | Explain the basic concepts of Circuit theory, semiconductor physics and analyze the PN junction diode and special purpose diode. |
| | | | | | | CO2 | Explain the BJT and FET and analyze various biasing techniques for BJT. |
| | | | | | | CO3 | Design electronic circuit using logic gates. |
| | | | | | | CO4 | Analyze basics working and principle of sensors. |
| 12 | VR19 | 12 | B.Tech-Information Technology | 1000191202 | Probability and Statistics | CO1 | Elucidate the notion of random variable and evaluate the expected value and probability of random variables. |
| | | | | | | CO2 | Apply Binomial, Poisson, Normal, gamma and Weibull distributions for real. data to compute probabilities, theoretical frequencies. |
| | | | | | | CO3 | Evaluate the confidence levels and maximum error for large and small samples. |
| | | | | | | CO4 | Analyze the concept of hypothesis testing for large and small samples in real life situations to draw the inferences and estimate the goodness of fit. |
| 13 | VR19 | 12 | B.Tech-Information Technology | 1005191210 | IT Workshop | CO1 | Assemble and disassemble components of a PC |
| | | | | | | CO2 | Construct a fully functional virtual machine |
| | | | | | | CO3 | Summarize various linux operating system commands |
| | | | | | | CO4 | Secure a computer from cyber threats. |
| 14 | VR19 | 12 | B.Tech-Information Technology | 1000191130 | Constitution of India | CO1 | Have general knowledge and legal literacy and thereby to take up competitive examinations. |
| | | | | | | CO2 | Distinguish the power of state and central central governament |
| | | | | | | CO3 | Summarize theelection procedure in India before and after independence |
| | | | | | | CO4 | Association with the powers and functions of Municipalities, Panchayats and Cooperative Societies. |
| 15 | VR19 | 12 | B.Tech-Information Technology | 1005192100 | Discrete Mathematical Structures | CO1 | Demonstrate skills in solving counting problem |
| | | | | | | CO2 | Develop reasoning skills using Mathematical Logic concepts. |
| | | | | | | CO3 | Identify the solutions for various problems using recurrence relations |
| | | | | | | CO4 | Apply concepts of graph theory for a given problem. |
| 16 | VR19 | 12 | B.Tech-Information Technology | 1005192101 | Digital Logic Design | CO1 | classify different number systems and generate various codes. |
| | | | | | | CO2 | Simplify the Boolean functions into minimum number of literals using k-maps, boolean laws and tabular methods. |
| | | | | | | CO3 | Design different combinational logic circuits. |
| | | | | | | CO4 | Apply knowledge of flip flops in designing registers and counters. |
| 17 | VR19 | 12 | B.Tech-Information Technology | 1005192120 | Data Structures through C | CO1 | Relate data structure concepts with real time applications. |
| | | | | | | CO2 | Apply linear and non linear data structures by identifying the appropriate need. |
| | | | | | | CO3 | Analyze searching and sorting techniques for effective management of data |
| | | | | | | CO4 | Design and implement operations of linear and nonlinear data structures |
| 18 | VR19 | 12 | B.Tech-Information Technology | 1005192121 | Java Programming | CO1 | Relate the procedural programming languages with object oriented paradigm |
| | | | | | | CO2 | Use Exception handling and multithreading mechanisms to create exception free and parallel real world applications |
| | | | | | | CO3 | Implement GUI for windows based applications with modern tools. |
| | | | | | | CO4 | Design various layouts along with applet usage |

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| 19 | VR19 | 12 | B.Tech-Information Technology | 1099192100 | Managerial Economics and Financial Analysis | CO1 | Analyze the Demand, Price and Cost. |
| | | | | | | CO2 | Identify the Nature of different markets to determine Price Output for different Business Units |
| | | | | | | CO3 | Understand Various Business Forms |
| | | | | | | CO4 | Evaluate investment project proposals |
| 20 | VR19 | 12 | B.Tech-Information Technology | 1020192100 | Employability Readiness Program | CO1 | Produce adequate writing skills that are needed in an organization |
| | | | | | | CO2 | Evaluate the core competencies to succeed in professional and personal life |
| | | | | | | CO3 | Solve various mathematics problems by following different methods and to perform well in various competitive exams and placement drives. |
| | | | | | | CO4 | Developing new strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. |
| 21 | VR19 | 12 | B.Tech-Information Technology | 1020192101 | Public Administration | CO1 | Understand definition, scope, approach and theories of public administration. |
| | | | | | | CO2 | Identify the process and technique of decision making and also understand the concept of administrative behaviour and control. |
| | | | | | | CO3 | Understand the process and technique of personnel and financial administration. |
| | | | | | | CO4 | Understand definition, scope, approach and theories of public administration. |
| | | | | | | CO5 | Discuss the tools that modern public administrators use to pursue public goals and public policy, along with the pros and cons of those tools. |
| 22 | VR19 | 12 | B.Tech-Information Technology | 1020192102 | Foreign Linguistic - French | CO1 | Students have the adequate reading and speaking skills and will be able to express himself in French. |
| | | | | | | CO2 | Understand the grammar and use them in their personal and professional life. |
| | | | | | | CO3 | Students will be able to write proficiently in French. |
| | | | | | | CO4 | Students will be able to compare and contrast world culture and it will expand his knowledge about various culture. |
| 23 | VR19 | 12 | B.Tech-Information Technology | 1012192170 | Mini Project – I EPICS/Societal relevant project | CO1 | Survey various social problems present in the viscinity & develop solution in technical aspects. |
| | | | | | | CO2 | Compare and contrast various latest technologies like Internet of Things, 3D Printing, Mobile App Creation, Thinker CAD, and Web page development suitable for the chosen project. |
| | | | | | | CO3 | Apply the engineering knowledge, mathematics, design thinking and project management to develop a community project. |
| | | | | | | CO4 | Document project to the intended community and analyze the feedback collected from community and extend any kind of support in future by the students. |
| 24 | VR19 | 12 | B.Tech-Information Technology | 1000192130 | Environmental Science (Audit Course) | CO1 | Gain a higher level of personal involvement and interest in understanding and solving environmental resource problems and its sustainable conservation practices. |
| | | | | | | CO2 | Sustaining the relationship between man and ecosystem & biodiversity. |
| | | | | | | CO3 | Enhance knowledge relating to the biological systems involved in the major global environmental problems of the 21st century |
| | | | | | | CO4 | Recognize the interconnectedness of human dependence on the earth's ecosystems and Influence their society in proper utilization of goods and services. |
| 25 | VR19 | 12 | B.Tech-Information Technology | 1005192200 | Computer Organization & Architecture | CO1 | Apply the concepts of basic functional units to demonstrate the working of computational system. |
| | | | | | | CO2 | analyze the design issues in the development of processor and other components to articulate improvement in computer design. |
| | | | | | | CO3 | Design Arithmetic Logic unit by analyzing performance issues |
| | | | | | | CO4 | Compare various Memory organizations. |

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| 26 | VR19 | 12 | B.Tech-Information Technology | 1005192201 | Software Engineering | CO1 | compare and contrast various software models applied to different real world applications. |
| | | | | | | CO2 | evaluate the process models for the development of SDLC |
| | | | | | | CO3 | Design a prototype for a software design and user interface & apply strategies of coding & testing for the development of software product |
| | | | | | | CO4 | Apply the knowledge about cost effect estimation and maintenance of software system and modeling the software project by using CASE tools |
| 27 | VR19 | 12 | B.Tech-Information Technology | 1012192200 | Automata Theory and Complier Design | CO1 | Apply the basic concepts of Languages, operations of Languages, NFA, DFA and its conversions. |
| | | | | | | CO2 | Identify the similarities and differences among various parsing techniques and will be able to solve problems related to Shift reduce parsing, compute FIRST and FOLLOW sets, LR(0), LR(1) and LALR sets of items and parse table for a given grammar |
| | | | | | | CO3 | Construct syntax directed translations of simple statements and understand the working of procedure calls and use various storage allocation schemes for the better utilization of run time memory. |
| | | | | | | CO4 | Construct syntax directed translations of simple statements and understand the working of procedure calls and use various storage allocation schemes for the better utilization of run time memory. |
| 28 | VR19 | 12 | B.Tech-Information Technology | 1005192221 | Database Management Systems | CO1 | identify the basic concepts and various data model used in database design and formulate SQL queries. |
| | | | | | | CO2 | interpret use of normalization in designing the database. |
| | | | | | | CO3 | evaluate indexing and hashing technique used in database design. |
| | | | | | | CO4 | apply and relate the concept of transaction, concurrency control and recovery in database. |
| 29 | VR19 | 12 | B.Tech-Information Technology | 1012192120 | Python Programming | CO1 | Enumerate different environments to install Python IDE and run basic Python scripts. |
| | | | | | | CO2 | Ascertain use the operators, functions, key Concepts of Object Oriented Programming in python. |
| | | | | | | CO3 | Access Python from various online resources and import packages to the current working environment. |
| | | | | | | CO4 | Develop front end GUI using Visualization Libraries and Multithreading techniques. |
| 30 | VR19 | 12 | B.Tech-Information Technology | 1000192110 | Communication Skills Lab | CO1 | : Analyze the functions of language and grammar in spoken and written forms with an emphasis on LSRW Skills. |
| | | | | | | CO2 | Disseminate the relevant skills while performing GDs, interviews, oral presentations with a focus on Non verbal communication. |
| | | | | | | CO3 | Prepare and exhibit oral presentation skills by using ICT.(Individual/Team) |
| | | | | | | CO4 | Organize proper life skills for their employability. |
| 31 | VR19 | 12 | B.Tech-Information Technology | 1005192220 | Advanced Data Structures | CO1 | Analyze dictionary ADT along with hashing mechanisms. |
| | | | | | | CO2 | implement priority queues and their operations. |
| | | | | | | CO3 | Build efficient Binary Search Trees and Multiway search trees. |
| | | | | | | CO4 | Illustrate tries and various issues related to the design of file structures. |

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| 32 | VR19 | 12 | B.Tech-Information Technology | 1005193101 | Data Warehousing and Data Mining | CO1 | Identify stages in building a Data Warehouse and challenges in Data mining |
| | | | | | | CO2 | Access raw input data and apply data pre-processing techniques, generalization techniques and data characterization techniques to provide suitable input for a range of data mining algorithms |
| | | | | | | CO3 | Analyze data mining techniques like classification and Association rules that can be applied to data objects and to find the interesting patterns. |
| | | | | | | CO4 | Solve real world problems by using the various Clustering methods |
| 33 | VR19 | 12 | B.Tech-Information Technology | 1012193120 | Computer Networks (Integrated Course) | CO1 | compare and illustrate functionality of OSI and TCP/IP reference models. |
| | | | | | | CO2 | select and evaluate appropriate routing techniques among network protocols. |
| | | | | | | CO3 | Evaluate and analyze various application layer protocols. |
| | | | | | | CO4 | Choose and design appropriate protocol for desired communication service. |
| 34 | VR19 | 12 | B.Tech-Information Technology | 1005193102 | Operating Systems | CO1 | Categorize and assess various types of operating systems and execution of system calls at each phase. |
| | | | | | | CO2 | Analyze various process scheduling and memory management techniques to develop better solutions. |
| | | | | | | CO3 | Formulate dead lock management, resource management techniques and IPC abstraction. |
| | | | | | | CO4 | perform tasks in Windows/ UNIX / Linux /Android and other environments. |
| 35 | VR19 | 12 | B.Tech-Information Technology | 1012193150 | Principles of Programming Languages (Professional Elective-I) | CO1 | Recognize syntax and semantics of programming languages. |
| | | | | | | CO2 | Comprehend the list of variables, data types, and basic statements in programming languages. |
| | | | | | | CO3 | Analyze to understand the sub programs and implementation of Object oriented concepts. |
| | | | | | | CO4 | Identify the ways of adapt new programming languages. |
| 36 | VR19 | 12 | B.Tech-Information Technology | 1012193151 | NoSQL Databases (Professional Elective-I) | CO1 | Classify NoSQL, its characteristics and history, and the primary benefits for using NoSQL databases |
| | | | | | | CO2 | Characterize the major types of NoSQL databases including a primary use case and advantages/disadvantages of each type |
| | | | | | | CO3 | Create wide-column, document, key-value, graph and object-oriented databases, add content, and run queries |
| | | | | | | CO4 | Outline and develop basic storage architecture and distributed file systems |
| 37 | VR19 | 12 | B.Tech-Information Technology | 1012193152 | R- Programming (Professional Elective-I) | CO1 | Familiarize with R workspace and Programming with R |
| | | | | | | CO2 | Access online resources for R and import new function packages into the R workspace |
| | | | | | | CO3 | Apply math functions to calculate probability and statistical distributions and knowledge on Graphics in data visualization. |
| | | | | | | CO4 | Analyze the datasets using various models like linear, non-linear regression models, and classification techniques for data analysis |
| 38 | VR19 | 12 | B.Tech-Information Technology | 1005193154 | Advanced Computer Architecture (Professional Elective-I) | CO1 | analyze concepts of parallelism in hardware/software. |
| | | | | | | CO2 | Implement the Hardware for Arithmetic Operation |
| | | | | | | CO3 | Distinguish the performance of pipelining and non pipelining environment in a processor |
| | | | | | | CO4 | Analyze the performance of different scalar Computers |
| 39 | VR19 | 12 | B.Tech-Information Technology | 1001193161 | Industrial Waste and Waste Water Engineering (Open Elective) | CO1 | Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation |
| | | | | | | CO2 | Impart knowledge on selection of treatment methods for industrial wastewater. |
| | | | | | | CO3 | Describe the common methods of treatment in different industries |
| | | | | | | CO4 | Explain operational problems of common effluent treatment plant |

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| 40 | VR19 | 12 | B.Tech-Information Technology | 1003193161 | Industrial Robotics | CO1 | Summarize robot components, configurations and different end effectors |
| | | | | | | CO2 | Select a robot for a given application and illustrate the working principles of various actuators and sensors that can be used in the manipulator, control system that can be used as well as the method of programming the robot |
| | | | | | | CO3 | Analyze a given serial manipulator kinematically and dynamically |
| | | | | | | CO4 | Derive as well as analyze the equation of trajectory that the end-effector should follow given the boundary conditions. |
| 41 | VR19 | 12 | B.Tech-Information Technology | 1004193161 | Data Communications (Open Elective) | CO1 | Interpret ISO-OSI and TCP/IP models and various Network topology models |
| | | | | | | CO2 | Illustrate the concept of data framing and error control mechanisms |
| | | | | | | CO3 | Compare different types routing protocols |
| | | | | | | CO4 | Familiar with the World Wide Web concept |
| 42 | VR19 | 12 | B.Tech-Information Technology | 1002193151 | Energy Audit Conservation and Management (Open Elective) | CO1 | Analyze power factor improvement methods, and Demonstrate the operating principle of energy efficient motors |
| | | | | | | CO2 | Demonstrate principle and organizing energy management program |
| | | | | | | CO3 | Apply principles of energy auditing and propose energy conservation schemes |
| | | | | | | CO4 | analyse about space heating and ventilation methods and demonstrate the operation of various energy instruments |
| 43 | VR19 | 12 | B.Tech-Information Technology | 1099193130 | Professional Ethics & Human Values (Audit Course) | CO1 | Relate ethical human values |
| | | | | | | CO2 | Apply engineering knowledge for society |
| | | | | | | CO3 | Elaborate responsibility for safety & risk |
| | | | | | | CO4 | Outline the various current global issues |
| 44 | VR19 | 12 | B.Tech-Information Technology | 1012193220 | Advanced Java Web Technologies (Integrated Course) | CO1 | Create web-based applications using features of HTML and CSS. |
| | | | | | | CO2 | Develop reusable component for Graphical User Interface applications |
| | | | | | | CO3 | Apply the concepts of server side technologies for dynamic web applications. |
| | | | | | | CO4 | Implement the web based applications using effective data base access with rich client interaction. |
| 45 | VR19 | 12 | B.Tech-Information Technology | 1012193221 | Unified Modeling Language & Design Patterns (Integrated Course) | CO1 | Illustrate software design with UML diagrams |
| | | | | | | CO2 | Design software applications using OO concepts |
| | | | | | | CO3 | Identify various scenarios based on software requirements |
| | | | | | | CO4 | Apply UML based software design into pattern based design using design patterns |
| 46 | VR19 | 12 | B.Tech-Information Technology | Course Code : 1099192200 | Management Science | CO1 | Illustrate basic insights of management principles |
| | | | | | | CO2 | Summarize Production process, Quality control and Inventory techniques |
| | | | | | | CO3 | Indentify Strategies and policies to functional areas |
| | | | | | | CO4 | Apply Contemporary management Practices |
| 47 | VR19 | 12 | B.Tech-Information Technology | 1001193251 | Environmental Impact Assessment and Management | CO1 | Understand and assess the environmental impact |
| | | | | | | CO2 | Implement different methods in preparing Environmental Impact Statement |
| | | | | | | CO3 | Identify various mitigation measures that can be used |
| | | | | | | CO4 | Identify the methodology for controlling of environmental impacts, environmental indices and indicators |
| 48 | VR19 | 12 | B.Tech-Information Technology | 1012194100 | Applied Cryptography | CO1 | Apply the principles and practices of cryptography and network security |
| | | | | | | CO2 | Analyze the concepts of symmetric block cipher or conventional key encryption or private key encryption or one key encryption. |
| | | | | | | CO3 | Execute basic knowledge of public key cryptography or asymmetric key cryptography or two key cryptography. |
| | | | | | | CO4 | Implement cryptographic protocols, hash functions, authentication, key management, key exchange, signature, schemes Email and web security, viruses, firewalls. |

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| 49 | VR19 | 12 | B.Tech-Information Technology | 1005194120 | Machine Learning (Integrated Course) | CO1 | Appraise the importance of data and choose an appropriate algorithm to create a models |
| | | | | | | CO2 | Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervi |
| | | | | | | CO3 | Relate various machine learning and deep learning algorithms with real world application |
| | | | | | | CO4 | Analyze how to evaluate models build from the sample datasets on web |
| 50 | VR19 | 12 | B.Tech-Information Technology | 1005194100 | Big Data Analytics | CO1 | Relate different aspects of BigData in accordance with various big data applications |
| | | | | | | CO2 | Catergorize various dimensions of BigData (5V's) and its sources in real time. |
| | | | | | | CO3 | Make use of recent tools related to Hadoop, Spark and MapReduce etc |
| | | | | | | CO4 | Analyze the different aspects of cluster computing with real world applications |
| 51 | VR19 | 12 | B.Tech-Information Technology | 1012194150 | Software Testing (Professional Elective-III) | CO1 | Reproduce models to effectively test the applications. |
| | | | | | | CO2 | Apply techniques of transaction flow testing and dataflow testing in various programs |
| | | | | | | CO3 | Test the software using domain testing and Logic Based Testing |
| | | | | | | CO4 | Apply various software testing tools for real world applications |
| 52 | VR19 | 12 | B.Tech-Information Technology | 1005193254 | Advanced Databases (Professional Elective-III) | CO1 | choose appropriate techniques to Store data in the files |
| | | | | | | CO2 | Apply and analyze various terms related to transaction management in centralized and distributed database |
| | | | | | | CO3 | Examine the issues related to multimedia and mobile database performance |
| | | | | | | CO4 | Analyze and Implement the concept of object- relational database in development of various real time software. |
| 53 | VR19 | 12 | B.Tech-Information Technology | 1005193251 | Artificial Intelligence (Professional Elective-III) | CO1 | Choose appropriate methods in AI that may be suited to solve a given problem and Game Playing |
| | | | | | | CO2 | Make use of AI search algorithms and formalizations on real world problems |
| | | | | | | CO3 | Analyze the basic issues of different types of knowledge representation techniques to build intelligent system |
| | | | | | | CO4 | Apply probabilistic and fuzzy models to solve problems with uncertainty. |
| 54 | VR19 | 12 | B.Tech-Information Technology | 1012194151 | Mobile Computing (Professional Elective-III) | CO1 | Analyze, design and develop new mobile application. |
| | | | | | | CO2 | Apply various techniques that take new technical issue related to a new paradigm and come up with a solution(s). |
| | | | | | | CO3 | Create a new ad hoc network applications and/or algorithms/protocols. |
| | | | | | | CO4 | Design and develop any existing or new protocol related to mobile environment |
| 55 | VR19 | 12 | B.Tech-Information Technology | 1012194152 | UNIX Programming (Professional Elective-IV) | CO1 | Extract architecture and features of UNIX Operating System and differentiate it from other Operating Systems. |
| | | | | | | CO2 | Use of UNIX commands for various file handling and process control strategies. |
| | | | | | | CO3 | Build Regular expressions for pattern matching and apply them to various filters for a specific task |
| | | | | | | CO4 | Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem |

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| 56 | VR19 | 12 | B.Tech-Information Technology | 1012194153 | Full Stack Development (MERN) (Professional Elective-IV) | CO1 | Execute basic concepts of react,node, express and mongodb technologies |
| | | | | | | CO2 | Design front end application using React and Redux libraries |
| | | | | | | CO3 | Develop interactive web applications on server side with NOSQL databases. |
| | | | | | | CO4 | Build responsive web application communicating with RES API and managing data with NOSQL databases |
| 57 | VR19 | 12 | B.Tech-Information Technology | 1012194154 | Cyber Security & Forensics (Professional Elective-IV) | CO1 | Enumerate the computer forensics fundamentals |
| | | | | | | CO2 | compare and contrast the types of computer forensics technology |
| | | | | | | CO3 | CO3 Analyze various computer forensics systems used at various levels |
| | | | | | | CO4 | Illustrate the methods for data recovery, evidence collection and data seizure |
| 58 | VR19 | 12 | B.Tech-Information Technology | 1005193253 | Software Project Management (Professional Elective-IV) | CO1 | Examine how software devlopment life cycle models can impact the software deliverables |
| | | | | | | CO2 | conduct activities necessary to successfully complete and close the Software projects |
| | | | | | | c04 | develop the skills for tracking and controlling software deliverables |
| | | | | | | CO3 | Estimate the effort required for a software project development and identify software risks |
| 59 | VR19 | 12 | B.Tech-Information Technology | 1012194110 | Cryptography & Network Security Lab | CO1 | Evaluate different encryption algorithms on number theory |
| | | | | | | CO2 | Implement Symmetric cryptographic algorithms |
| | | | | | | CO3 | Implement Asymmetric cryptographic algorithms |
| | | | | | | CO4 | Execute Various Cryptographic Hash algorithms |
| 60 | VR19 | 12 | B.Tech-Information Technology | 1001194160 | Disaster Management (Open Elective-IV) | CO1 | Know the basic concepts in Disasters and its triggering factures |
| | | | | | | CO2 | Understand stages of hydrological disaster |
| | | | | | | CO3 | Analyse the causes, effects, impacts and of hydrological, geological and coastal hazards. |
| | | | | | | CO4 | Understand the mitigation procedure of uncertain events |
| 61 | VR19 | 12 | B.Tech-Information Technology | | Cloud Computing (Professional Elective-V) | CO1 | apply the knowledge of cloud technology to infer the working principles of cloud computing |
| | | | | | | CO2 | analyse cloud services extended by various cloud providers to build a cloud |
| | | | | | | CO3 | Identify emerging cloud programming paradigms and its software environments |
| | | | | | | CO4 | Design and develop the backup strategies for cloud data by pridcting the future risks |
| 62 | VR19 | 12 | B.Tech-Information Technology | | Natural Language Processing (Professional Elective-V) | CO1 | elucidate the parametric and linear models of classification in domain specific applications |
| | | | | | | CO2 | Compare and parameterize different learning algorithms in NLP applications |
| | | | | | | CO3 | Develop machine independent and unsupervised learning techniques. |
| | | | | | | CO4 | Apply pattern recognition techniques to real world problems such as documentation analysis and recognition |
| 63 | VR19 | 12 | B.Tech-Information Technology | 1012194250 | Ad-hoc Sensor Networks (Professional Elective-V) | CO1 | minimise and deploy the challenges in designing MAC, routing and transport protocols for wireless ad-hoc/sensor networks |
| | | | | | | CO2 | Comprehend the various sensor network Platforms, tools and applications. |
| | | | | | | CO3 | resolve the unique issues in ad-hoc/sensor networks |
| | | | | | | CO4 | Implement designing routing and transport protocols for wireless Ad-hoc/sensor networks. |
| 64 | VR19 | 12 | B.Tech-Information Technology | | Distributed Systems (Professional Elective-V) | CO1 | Illustrate the basic elements and concepts related to distributed system technologies |
| | | | | | | CO2 | List the characteristics of distributed systems for designing architectural models |
| | | | | | | CO3 | Enumerate the features and applications of important standard protocols which are used in the distributed system |
| | | | | | | CO4 | Interpret inter-process communication in a distributed system. |

VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY (A)
DEPARTMENT OF ELECTRONICS AND COMPUTER ENGINEERING
VR19 B.TECH. ECM COURSE OUTCOMES

| S.No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 1 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1000191100 | Mathematics-I | CO1 | Executing mean value theorems and evaluate maxima and minima of functions of two variables without constraints |
| | | | | | | CO2 | Apply the analytical methods to solve higher order linear differential equations. |
| | | | | | | CO3 | Evaluate of solution of Ordinary differential equations by using Laplace Transform technique. |
| | | | | | | CO4 | Identify and solve partial differential equations |
| 2 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1000191123 | Applied Chemistry | CO1 | Identification of different polymers and their functionalities |
| | | | | | | CO2 | Determination of structure to many compounds and apply the basic knowledge in construction of cell and its applications |
| | | | | | | CO3 | Analysis of corrosive environments and protection of precious metal |
| | | | | | | CO4 | Adoption of different green methodologies and acquire knowledge on different advanced materials |
| 3 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1000191101 | Mathematics – II | CO1 | Solve approximate roots of an equation by using different numerical methods. |
| | | | | | | CO2 | Compute Interpolating polynomial for the given data |
| | | | | | | CO3 | Compute Numerical Solution of ODE and Numerical Integration. |
| | | | | | | CO4 | Evaluate simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix. |
| 4 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1003191101 | Engineering Drawing | CO1 | Understand the use of drawing instruments to construct the polygons and curves |
| | | | | | | CO2 | Learn the principle of orthographic projections. Draw Orthographic projections of points, lines. |
| | | | | | | CO3 | Draw the various types of planes and solids its views in different Positions |
| | | | | | | CO4 | Draw isometric views of simple objects |
| 5 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005191120 | Problem Solving And Programming using C | CO1 | Write compile and debug Programs in C language |
| | | | | | | CO2 | Use operators, data types and write programs |
| | | | | | | CO3 | Select the best loop construct for a given problem |
| | | | | | | CO4 | Design and implement C programs |
| 6 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1000191110 | Engineering Exploration | CO1 | Realize the purpose/Role of Engineer for solving social problems |
| | | | | | | CO2 | Learn to Design a component/system in an engineering way |
| | | | | | | CO3 | Learn to use mechanisms, Arduino, sensors, motors. |
| | | | | | | CO4 | Integrating different systems (mechanical/Electrical/computer) to work as a unit |

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| 7 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1000191200 | Transforms and Vector Calculus | CO1 | Formulate any period function in terms of sine and cosine |
| | | | | | | CO2 | Simplify a non periodic function as integral representation |
| | | | | | | CO3 | Apply multiple integration techniques in evaluating areas and volume bounded by region. |
| | | | | | | CO4 | Explain Gradient, divergence and curl operations in vector and scalar fields and apply Green's, Gauss and Stokes theorem as the generalisation of fundamental theorem of integral calculus. |
| 8 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1000191222 | Wave Optics and Semiconductor Physics | CO1 | Discuss the wave phenomena of light and apply these principles to describe electromagnetic wave propagation. |
| | | | | | | CO2 | Apply the knowledge of basic quantum mechanics, to set up one-dimensional Schrodinger's wave equation. |
| | | | | | | CO3 | Identify the importance of classical and quantum mechanical treatment of materials. |
| | | | | | | CO4 | Make use of the basic concepts of energy bands in crystalline solids to understand semiconductor physics. |
| 9 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005191221 | Data Structures | CO1 | Outline the need for data structure techniques. |
| | | | | | | CO2 | Implement standard data. |
| | | | | | | CO3 | structures like stack, queue, list, tree and graph. |
| | | | | | | CO4 | structures like stack, queue, list, tree and graph. |
| 10 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1002191201 | Network Analysis | CO1 | Apply the basic circuit analysis techniques, in DC circuits and To know the performance of the circuits |
| | | | | | | CO2 | Analyze steady state analysis of AC circuits |
| | | | | | | CO3 | Analyze steady state analysis of electrical circuits using theorems |
| | | | | | | CO4 | Gain the knowledge in characteristics of two port networks using parameters (Z, Y, ABCD, h ) and Analyze Transient state analysis of Accircuits |
| 11 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1000191121 | Technical English Communication | CO1 | Read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources, Social Awareness |
| | | | | | | CO2 | Analyze the functions of language and grammar in spoken and written forms. |
| | | | | | | CO3 | Write effectively on various domains. |
| | | | | | | CO4 | Prepare and exhibit oral presentation skills by using ICT(Individual/Team) |
| 12 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005191210 | IT Workshop | CO1 | Understand the basic components and peripherals of a computer. |
| | | | | | | CO2 | To become familiar in configuring a system. |
| | | | | | | CO3 | Learn the usage of productivity tools. |
| | | | | | | CO4 | Acquire knowledge about the netiquette and cyber hygiene. |
| 13 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1000191130 | Constitution of India | CO1 | Have general knowledge and legal literacy and thereby to take up competitive examinations. |
| | | | | | | CO2 | Distinguish the power of state and central central government |
| | | | | | | CO3 | Summarize the election procedure in India before and after independence |
| | | | | | | CO4 | Association with the powers and functions of Municipalities, Panchayats and Cooperative Societies. |

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| 15 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1099192100 | Managerial Economics and Financial Analysis | CO1 | Analyze the Demand, Price and Cost. |
| | | | | | | CO2 | Identify the Nature of different markets to determine Price Output for different Business Units |
| | | | | | | CO3 | Interpret various forms of businesses |
| | | | | | | CO4 | Evaluate and Prepare investment project proposals and Financial Statements |
| 16 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1000191202 | Probability and Statistics | CO1 | Explain the notion of random variable and evaluate the expected value and probability of random variables. |
| | | | | | | CO2 | Apply Binomial, Poisson, Normal, gamma and weibull distributions for real data to compute probabilities, theoretical frequencies. |
| | | | | | | CO3 | Evaluate the confidence levels and maximum error for large and small samples |
| | | | | | | CO4 | Apply the concept of hypothesis testing for large and small samples in real life situations to draw the inferences and estimate the goodness of fit. |
| | | | | | | C05 | Examine correlation for the bi-variate data and fit the different curves using principle of least squares and to predict the regression analysis |
| 17 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1004192120 | Electronics Devices & Circuits | CO1 | Summarize the characteristics of PN junction diode in different modes of operation. |
| | | | | | | CO2 | Compare the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons. |
| | | | | | | CO3 | Summarize the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations and understand the various biasing techniques for BJT and FET. |
| | | | | | | CO4 | Explain the stabilization concepts with expressions and perform the analysis of small signal low frequency transistor amplifier circuits using BJT |
| 18 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1012192120 | Python Programming | CO1 | Install Python IDE and run basic Python scripts. |
| | | | | | | CO2 | Understand the operators, functions, key Concepts of Object Oriented Programming in python. |
| | | | | | | CO3 | Access Python from various online resources and import packages to the current working environment. |
| | | | | | | CO4 | Understand file handling operations and implement ML/DS Libraries using in Python. |
| 19 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019192100 | Digital Logic Design | CO1 | Describe various number systems, error detecting and correcting binary codes. |
| | | | | | | CO2 | Apply boolean laws, k-map & Q-M methods to minimize switching functions. |
| | | | | | | CO3 | Design combinational and sequential logic circuits |
| | | | | | | CO4 | Design simple digital systems using PLDs. |

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| 20 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1004192100 | Signals and Systems | CO1 | Characterize the signals and systems and principles of vector spaces, Concept of orthogonality |
| | | | | | | CO2 | Analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform. |
| | | | | | | CO3 | Apply sampling theorem to convert continuous- time signals to discrete-time signal and also apply z-transform to analyze discrete-time signals and systems |
| | | | | | | CO4 | Illustrate the relationships among the various representations of LTI systems and apply the Concepts of convolution, correlation, Energy and Power density spectrums to communication problems. |
| 21 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019192170 | Mini Project-I (EPICS/Societal Relevant Project) | CO1 | Understand the various social problems present in the world & they will be able to identify and select a community problem to develop a technological project. |
| | | | | | | CO2 | Understand the various social problems present in the world & they will be able to identify and select a community problem to develop a technological project. |
| | | | | | | CO3 | Learn the technologies like Internet of Things, 3D Printing, Mobile App Creation, Thinker CAD, and Web page development. |
| | | | | | | CO4 | Apply the engineering knowledge, mathematics, design thinking and project management to develop a community project. |
| 22 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005192201 | Software Engineering | CO1 | Compare and contrast various software models applied to different real world applications. |
| | | | | | | CO2 | Evaluate the process models for the development of SDLC |
| | | | | | | CO3 | Design a prototype for a software design and user interface & apply strategies of coding & testing for the development of software product |
| | | | | | | CO4 | Design a prototype for a software design and user interface & apply strategies of coding & testing for the development of software product |
| 23 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019192200 | Electrical Technology and Instrumentation | CO1 | Understand DC machines operation, testing and calculate the efficiency of DC machines. |
| | | | | | | CO2 | Analyze the performance of transformer 3-phase alternator and 3- phase induction motors. |
| | | | | | | CO3 | Explain and analyze the operation of Electrical and Electronic Measuring instruments |
| | | | | | | CO4 | Describe the working principle of various sensors and actuators. |
| 24 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019192201 | Principles of Communications | CO1 | Understand the basic principle of communication system |
| | | | | | | CO2 | Describe the principles of Analog and Digital modulation techniques and be able to analyze their performance |
| | | | | | | CO3 | Explain the various communication system parameters for different types of modulation and demodulation techniques. |
| | | | | | | CO4 | Distinguish various Analog and Digital modulation techniques. |

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| 25 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019192220 | Computer Operating Systems | CO1 | Apply the appropriate process models for the application development of SDLC. |
| | | | | | | CO2 | Understand the phases of SDLC from requirement gathering phase to design phase via Analysis Phase. |
| | | | | | | CO3 | Analyzing the strategies for coding and testing phase in Software product development. |
| | | | | | | CO4 | Apply the knowledge about estimation and maintenance of software systems and modeling the software project by using CASE tools. |
| 26 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019192221 | Pulse and Digital Circuits | CO1 | Understand and Apply the fundamental concepts of wave shaping for various switching and signal generating circuits. |
| | | | | | | CO2 | Understand and Apply the fundamental concepts of wave shaping for various switching and signal generating circuits. |
| | | | | | | CO3 | Analyze the different multivibrators and time base generators |
| | | | | | | CO4 | Analyze the different multivibrators and time base generators |
| 27 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1000192130 | Environmental Science (Audit Course) | CO1 | Gain a higher level of personal involvement and interest in understanding and solving environmental resource problems and its conservation practices. |
| | | | | | | CO2 | Overall understanding of different types of natural resources and its conservation |
| | | | | | | CO3 | Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century. |
| | | | | | | CO4 | Recognize the interconnectedness of human dependence on the earth's ecosystems and Influence their society in proper utilization of goods and services. Learn the management of environmental hazards and to mitigate disasters and have a clear understanding of environmental concerns and follow sustainable development practices. |
| 28 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1000192110 | Communication Skills Lab | CO1 | Analyze the functions of language and grammar in spoken and written forms with an emphasis on LSRW Skills |
| | | | | | | CO2 | Disseminate the relevant skills while performing GDs, interviews, oral presentations with a focus on Non verbal communication |
| | | | | | | CO3 | Prepare and exhibit oral presentation skills by using ICT.(Individual/Team) |
| | | | | | | CO4 | Organize proper life skills for their employability. |

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| 29 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193120 | Linear & Digital IC Applications | CO1 | Understand basic operation and characteristics of op-amp. |
| | | | | | | CO2 | Understand basic operation and characteristics of op-amp. |
| | | | | | | CO3 | Explain the basic operation and characteristics of different Logic Families |
| | | | | | | CO4 | Design of digital logic Circuits using IC's |
| 30 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005192200 | Computer Organization & Architecture | CO1 | Conceptualize the basics of organizational and architectural issues of a digital computer and to perform computer arithmetic operations. |
| | | | | | | CO2 | Analyze performance issues in processor and can calculate the effective address of an operand by addressing modes. |
| | | | | | | CO3 | Ability to design memory organization that uses banks for different word size operations to understand the concept of cache memory techniques. |
| | | | | | | CO4 | Describe the concept of Input / Output organization. |
| 31 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005192221 | Database Management Systems | CO1 | Identify the basic concepts and various data model used in database design and formulate SQL queries. |
| | | | | | | CO2 | Intrepret use of normalization in designing the database. |
| | | | | | | CO3 | Evaluate indexing and hashing technique used in database design. |
| | | | | | | CO4 | Apply and relate the concept of transaction, concurrency control and recovery in database. |
| 32 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193100 | Fundamentals of Algorithm Design and Analysis | CO1 | Able to analyze the performance of an algorithm in terms of time and space. |
| | | | | | | CO2 | Give an intuition on how to find a solution to large problems by dividing them into smaller sub problems. |
| | | | | | | CO3 | Identifying which designing technique can be used to solve a particular problem. |
| | | | | | | CO4 | Knowing how to explore the solution space by using Branch and Bound technique. |
| 33 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193150 | Wireless Sensor Networks (Professional Elective-I) | CO1 | Understand the basis of Sensors with its applications |
| | | | | | | CO2 | Conceptualize the networking technologies |
| | | | | | | CO3 | Explain the protocols for wireless sensor networks |
| | | | | | | CO4 | Analyze routing and congestion algorithms |
| | | | | | | C05 | Understand the basis of Sensors with its applications |
| 34 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193151 | Advanced Data Structures and Algorithms (Professional Elective-I) | CO1 | Understand graph representations, Minimum Spanning Trees and traversals |
| | | | | | | CO2 | Understand graph representations, Minimum Spanning Trees and traversals |
| | | | | | | CO3 | Implement heaps, queues and their operations, B Trees and B+ Trees |
| | | | | | | CO4 | Illustration of tries which share some properties of table look up, various issues related to the design of file structures |

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| 35 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193152 | Digital Signal Processing and Architecture (Professional Elective-I) | CO1 | Design, simulate and realize different digital filters. |
| | | | | | | CO2 | Estimate the spectra of signals that are to be processed by discrete time system and to verify the performance of various spectrum estimation techniques |
| | | | | | | CO3 | Design multi rate digital signal processing system. |
| | | | | | | CO4 | Understand the architecture of DSP processor |
| 36 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193153 | Introudction to Computer Networks (Professional Elective-I) | CO1 | Define Network and its components and Illustrate the functionality of OSI and TCP/IP reference models. |
| | | | | | | CO2 | Compare different network layer protocols and Demonstrate various types of routing technique |
| | | | | | | CO3 | Evaluate Architecture for Application layer protocols. |
| | | | | | | CO4 | Choose appropriate protocol for desired communication service. |
| 37 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1020192100 | Employability Readiness Program-I (Open Elective-I) | CO1 | Students have the adequate writing skills that are needed in an organization |
| | | | | | | CO2 | Understand the core competencies to succeed in professional and personal life |
| | | | | | | CO3 | Solve various Basic Mathematics problems by following different methods and to perform well in various competitive exams and placement drives. |
| | | | | | | CO4 | Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. |
| 38 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1020192101 | Public Administration | CO1 | Students will be able to understand definition, scope, approach and theories of public administration. |
| | | | | | | CO2 | Students will be able to identify the process and technique of decision making and also understand the concept of administrative behaviour and control. |
| | | | | | | CO3 | Students will be able to understand the process and technique of personnel and financial administration. |
| | | | | | | CO4 | Students will be able to Discuss the tools that modern public administrators use to pursue public goals and public policy, along with the pros and cons of those tools. |
| | | | | | | C05 | Students will be able to understand and explain the major administrative techniques and values that public administration has and illustrate how those affect the work of government and also understand the process of administrative improvement. |

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| 39 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1020192102 | Foreign Linguistic - French | CO1 | Students have the adequate reading and speaking skills and will be able to express himself in French. |
| | | | | | | CO2 | Understand the grammar and use them in their personal and professional life. |
| | | | | | | CO3 | Students will be able to write proficiently in French. |
| | | | | | | CO4 | Students will be able to compare and contrast world culture and it will expand his knowledge about various culture. |
| 40 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1099193130 | Professional Ethics & Human Values | CO1 | Relate ethical human values |
| | | | | | | CO2 | Apply engineering knowledge for society. |
| | | | | | | CO3 | Elaborate responsibility for safety & risk |
| | | | | | | CO4 | Outline the various current global issues |
| 41 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193180 | Technical Seminar | CO1 | Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of computer science and engineering. |
| | | | | | | CO2 | Simulate and analyze the results reported in the chosen paper for seminar topic. |
| | | | | | | CO3 | Communicate effectively before the expert panel and develop technical reports. |
| | | | | | | CO4 | Respond to the queries raised by the evaluation committee and audience |
| 42 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193220 | Micro Processors and Micro Controllers | CO1 | Understand the concepts of architecture, memory organization of Intel 8086 microprocessor and Intel 8051 and PIC 16C6X/7X microcontrollers. |
| | | | | | | CO2 | Summarize the concepts of addressing modes, instruction set of Intel 8086 microprocessor and Intel 8051 and PIC microcontroller. |
| | | | | | | CO3 | Develop an assembly language programs for simple problem statements of 8086, 8051 and PIC microcontroller. |
| | | | | | | CO4 | Design an interface between peripheral chips & processors using assembly language programs. |
| 43 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193221 | Web Design | CO1 | Understand the basic concepts of client server application and WWW |
| | | | | | | CO2 | Describe the basic concepts of HTML & CSS to design web pages and web site |
| | | | | | | CO3 | Analyze a given problem and apply requisite appropriate tools for designing interactive web applications. |
| | | | | | | CO4 | Develop reusable component for Graphical User Interface applications |
| 44 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193250 | VLSI Technology (Professional Elective-II) | CO1 | Describe the fabrication process for MOS,CMOS and BICMOS technologies along with their electrical properties |
| | | | | | | CO2 | Outline the concepts of design rules during the layout design |
| | | | | | | CO3 | Model various scaling Models and factors and their effects on MOSFET parameters. |
| | | | | | | CO4 | Examine various design issues of VLSI Circuits and illustrate FPGA Design |

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| 45 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193251 | Cellular and Mobile Communications (Professional Elective-II) | CO1 | Understand the concepts, characteristics, principles and operation of cellular systems. |
| | | | | | | CO2 | Apply Concepts, principles to Co- channel interference Reduction factor, Desired C/I, directional Antenna system and Cell splitting. |
| | | | | | | CO3 | Analyse Point to point model, other cell coverage of signal and traffic, frequency and channel assignment strategies. |
| | | | | | | CO4 | Compare concepts of handoff and architectures of GSM, Technology comparison of 3G, 4G and 5G cellular systems. |
| 46 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005193101 | Data Warehousing and Data Mining (Professional Elective-II) | CO1 | Identify stages in building a Data Warehouse and challenges in Data mining |
| | | | | | | CO2 | Access raw input data and apply data pre- processing techniques, generalization techniques and data characterization techniques to provide suitable input for a range of data mining algorithms |
| | | | | | | CO3 | Analyze data mining techniques like classification and Association rules that can be applied to data objects and to find the interesting patterns. |
| | | | | | | CO4 | Solve real world problems by using the various Clustering methods |
| 47 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1012192200 | Automata Theory and Complier Design (Professional Elective-II) | CO1 | Apply the basic concepts of Languages, operations of Languages, NFA, DFA and its conversions. |
| | | | | | | CO2 | Identify the similarities and differences among various parsing techniques and will be able to solve problems related to Shift reduce parsing, compute FIRST and FOLLOW sets, LR(0), LR(1) and LALR sets of items and parse table for a given grammar |
| | | | | | | CO3 | Demonstrate the ability to write syntax directed translations of simple statements and understand the working of procedure calls and use various storage allocation schemes for the better utilization of run time memory. |
| | | | | | | CO4 | Apply various schemes for optimized code and will be able to write 3 addresses code and identify the basic blocks, draw flow graphs and represent directed Acyclic graphs for the identified basic blocks and also be able to write the target optimized code (assembly code) for the given three address code. |

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| 48 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1020193100 | Employability Readiness Program-II (Open Elective-II) | CO1 | Students have the adequate writing skills that are needed in an organization and To perform well during Campus Drives and different Interviews |
| | | | | | | CO2 | Understand the core competencies to succeed in professional and personal life and Students will develop knowledge and experience with the use of the standard C programming language, |
| | | | | | | CO3 | Solve various Basic Mathematics problems by following different methods and analyses, summarize and present information in quantitative forms including table, graphs and formulas. |
| | | | | | | CO4 | Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. |
| 49 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1004193250 | Digital Design System through Verilog HDL (Open Elective-II) | CO1 | Describe Verilog HDL and Design Digital circuits. |
| | | | | | | CO2 | Write behavior model of digital circuits and Write RTL models of digital circuits. Verify behavior and RTL models |
| | | | | | | CO3 | Describe standard Cell Libraries and FPGAs Synthesize RTL models to standard cell libraries and FPGAs. |
| | | | | | | CO4 | Implement RTL models on FPGAs and testing and verification |
| 50 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1004193251 | ARM Processes (Open Elective-II) | CO1 | Able to explain Implementation of RISC design and ARM design in ARM processors. |
| | | | | | | CO2 | Program on LPC 2148 for the specific application. |
| | | | | | | CO3 | Understand the peripherals microcontroller systems. |
| | | | | | | CO4 | Compare the specifications and suitability of I2C, SPI, RTC, WATCHDOG,TIMER, PWM generation blocks. |
| 51 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1001193260 | Environmental Impact Assessment and Management (Open Elective – II) | CO1 | Understand evaluate and create the basic concept of environmental impact assessment, Flow of EIA, Types of environmental Impacts. |
| | | | | | | CO2 | Implement different methods in preparing an Environmental Impact Statement. |
| | | | | | | CO3 | Identify various mitigation measures that can be used. |
| | | | | | | CO4 | Select methodology for identification of environmental impacts, environmental indices and indicators |

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| 52 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005193261 | Object Oriented Programming thorugh Java (Open Elective-III) | CO1 | Identify the principles of object oriented programming through Java features. |
| | | | | | | CO2 | Designing the programs to read the input dynamically |
| | | | | | | CO3 | Analyze the programs to implement the predefined and user defined exceptions with real world scenario. |
| | | | | | | CO4 | Implement and analyze the programs to provide the same services to multiple clients at the same time using synchronization concepts. |
| 53 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005193262 | Object Oriented Analysis and Design (Open Elective-III) | CO1 | BUIld solutions to the complex problems using objecr oriented approach |
| | | | | | | CO2 | identify classes and responsibilities of the problem domain |
| | | | | | | CO3 | apply uml tools for various case studies |
| | | | | | | CO4 | represent classes objects responsiblities and states using uml notations |
| 54 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005193263 | Cryptography and Network Security (Open Elective-III) | CO1 | Understand the principles and practices involved in cryptography and network security |
| | | | | | | CO2 | Describe the various symmetric and Asymmetric encryption algorithms. |
| | | | | | | CO3 | Identifying cryptographic protocols, hash functions, authentication, key management, key exchange, signature schemes |
| | | | | | | CO4 | Design of network security solutions for E- mail Security like PGP, S/MIME and web security like SSL, TLS. |
| 55 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1012193100 | R Programming (Open Elective-III) | CO1 | Understand the R workspace and Programming with R |
| | | | | | | CO2 | Access online resources for R and import new function packages into the R workspace |
| | | | | | | CO3 | Apply math functions to calculate probability and statistical distributions and knowledge on Graphics in data visualization. |
| | | | | | | CO4 | Understand and use linear, non-linear regression models, and classification techniques for data analysis |
| 56 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193262 | Radar Systems (Open Elective –III) | CO1 | Interpret the factors affecting the radar performance using Radar Range Equation. |
| | | | | | | CO2 | Apply the principle of FMCW radar in the design of altimeter. |
| | | | | | | CO3 | Analyze the principle of each and every block of MTI and Tracking Radar. |
| | | | | | | CO4 | Demonstrate the basic principle of Receiver and also extraction of signal in Noise. |
| 57 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1099192200 | Management Science | CO1 | Illustrate basic insights of management principles |
| | | | | | | CO2 | Summarize Production process, Quality control and Inventory techniques |
| | | | | | | CO3 | Indentify Strategies and policies to functional areas |
| | | | | | | CO4 | Apply Contemporary management Practices |

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| 59 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193260 | Internet of Things (Open Elective) | CO1 | Understand the Architectural view , protocols and applications of IoT. |
| | | | | | | CO2 | Analyse the communication protocols and standards used in IoT. |
| | | | | | | CO3 | Design the simple IoT applications to monitor or control IoT devices using simulation or hardware. |
| | | | | | | CO4 | Implementation of the real time IoT applications. |
| 60 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193261 | Embedded System Design (Open Elective) | CO1 | Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function |
| | | | | | | CO2 | Design the Embedded hardware by considering the hardware components required for an embedded system. |
| | | | | | | CO3 | Analyse the various embedded firmware design approaches on embedded environment to suit for desired application. |
| | | | | | | CO4 | Interprete how to integrate hardware and firmware of an embedded system and apply this knowledge to real time operating system |
| 61 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005194120 | Machine Learning (Integrated Course) | CO1 | Recognize the characteristics of machine learning that make it useful to real-world Problems |
| | | | | | | CO2 | Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervised |
| | | | | | | CO3 | Be able to use support vector machine, regularized regression algorithms |
| | | | | | | CO4 | Understand the concept behind neural networks for learning non-linear functions |
| 62 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | | Machine Learning Lab | CO1 | Understand the implementation procedures for the machine learning algorithms |
| | | | | | | CO2 | Design Java/Python programs for various Learning algorithms. |
| | | | | | | CO3 | Apply appropriate data sets to the Machine Learning algorithms |
| | | | | | | CO4 | Identify and apply Machine Learning algorithms to solve real world problems |
| 63 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019194120 | IOT and its Applications | CO1 | Understand the Architectural view , protocols and applications of IoT. |
| | | | | | | CO2 | Analyse the communication protocols and standards used in IoT |
| | | | | | | CO3 | Design the simple IoT applications to monitor or control IoT devices using simulation or hardware. |
| | | | | | | CO4 | Implementation of the real time IoT applications. |
| 64 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005194100 | Big Data Analytics (Professional Elective-III) | CO1 | Relate different aspects of BigData in accordance with various big data applications |
| | | | | | | CO2 | Catergorize various dimensions of BigData (5V's) and its sources in real time |
| | | | | | | CO3 | Make use of recent tools related to Hadoop, Spark and MapReduce etc |
| | | | | | | CO4 | Analyze the different aspects of cluster computing with real world applications |

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| 65 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005193251 | Artificial Intelligence (Professional Elective – III) | CO1 | Choose appropriate methods in AI that may be suited to solve a given problem and Game Playing |
| | | | | | | CO2 | Make use of AI search algorithms and formalizations on real world problems |
| | | | | | | CO3 | Analyze the basic issues of different types of knowledge representation techniques to build intelligent system. |
| | | | | | | CO4 | Apply probabilistic and fuzzy models to solve problems with uncertainty. |
| 66 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019194150 | Wireless Communication Systems (Professional Elective-III) | CO1 | Apply communication concepts to solve wireless communications problems. Submit Review report from Research journals with professional ethics, team work and self-learning. |
| | | | | | | CO2 | Identify existing model's, Apply cellular system design concepts, wireless wide area networks for their performance analysis. Submit Review report from Research journals with professional ethics, team work and self-learning. |
| | | | | | | CO3 | Analyse various multiple access schemes used in wireless communications and existing and emerging wireless standards. Submit Review report from Research journals with rofessional ethics, team work and self-learning. |
| 67 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019193261 | Embedded System Design (Professional Elective-III) | CO1 | Understand the basic concepts and hardware components of an embedded system and able to know the design approach to perform a specific function. |
| | | | | | | CO2 | Identify hardware components required for an embedded system design. |
| | | | | | | CO3 | Apply various embedded firmware design approaches on embedded environment. |
| | | | | | | CO4 | Understand how to integrate hardware and firmware of an embedded system using real time operating system. |
| 68 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019194151 | Fundamentals of Digital Image Processing (Professional Elective-IV) | CO1 | Examine the fundamentals of gray scale and color image processing. |
| | | | | | | CO2 | Apply different transforms and compression methods on image for image processing applications. |
| | | | | | | CO3 | Analyze the methods to extract information from the image in terms of spatial filtering, frequency filtering, restoration and segmentation. |
| | | | | | | CO4 | Validate the different techniques of color and multi resolution processing. |
| 69 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1004193160 | Data Communications (Professional Elective-IV) | CO1 | Understanding of basic digital switching techniques. |
| | | | | | | CO2 | Analyze the OSI model, TCP/IP model, MAC layer protocols and LAN technologies |
| | | | | | | CO3 | Design of different Elementary Data Link Protocols. |
| | | | | | | CO4 | Minimize the error by using different control methods. |

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| 70 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005194154 | Cloud Computing (Professional Elective-IV) | CO1 | Apply the knowledge of cloud technology to infer the working principles of cloud computing |
| | | | | | | CO2 | Analyse cloud services extended by various cloud providers to build a cloud |
| | | | | | | CO3 | Identify emerging cloud programming paradigms and its software environments |
| | | | | | | CO4 | Design and develop the backup strategies for cloud data by pridcting the future risks |
| 71 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019194160 | Human Computer Interaction (Professional Elective-IV) | CO1 | Apply the basics of human and computational abilities and limitations |
| | | | | | | CO2 | Analyze and design software systems, components to meet desired needs. |
| | | | | | | CO3 | Practice a variety of simple methods for evaluating the quality of a user interface, new theories, tools and techniques in HCI. |
| | | | | | | CO4 | Apply appropriate HCI techniques to design systems that are usable by people, fundamental aspects of designing and evaluating interfaces. |
| 72 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019194161 | Satelliete Communications (Open Elective - IV) | CO1 | Outline orbital mechanics and launch methodologies |
| | | | | | | CO2 | Apply Concepts of Attitude and orbit control, telemetry, tracking, Command and monitoring, communication in satellite subsystems. |
| | | | | | | CO3 | Design link power budget for satellites |
| | | | | | | CO4 | Compare satellite access techniques |
| 73 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1019194162 | Robotics | CO1 | identify various robot configuration and components |
| | | | | | | CO2 | Select Appropriate actutators and senors for a robot based on specific applications |
| | | | | | | CO3 | Carry out kinematic and dynamic analysis for simple serial kinematic chains |
| | | | | | | CO4 | perform trajectory planning for a manipulator by avoiding obstacles |
| 74 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005194161 | Fundamentals of Block Chain Technology | CO1 | Explain the functional/operational aspects of crypto currency ecosystem. |
| | | | | | | CO2 | Describe emerging abstract models for Blockchain Technology |
| | | | | | | CO3 | Identify major research challenges and technical gaps existing in between theory and practice in cryptocurrency domain. |
| | | | | | | CO4 | Explain fundamental characteristics of block chain using bit coin. |
| 75 | VR19 | 19 | B.Tech-Electronics and Computer Engineering | 1005193253 | Software Project Management (Open Elective-IV) | CO1 | Explain the basic concepts and issues of software project management |
| | | | | | | CO2 | Compare the iterative and incremental lifecycle models. |
| | | | | | | CO3 | Find out and schedule the required resources for the project execution. |
| | | | | | | CO4 | Estimate the effort required for a software project development and identify software risks. |

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)
DEPARTMENT OF MECHANICAL ENGINEERING
VR19 - M.Tech- Machine Design Course Outcomes

| S No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 1 | VR19 | 15 | M.Tech - Machine Design | 2000191100 | Research Methodology and IPR | CO1 | Discuss the process used for research Problem selection and Research Paper Writing |
| | | | | | | CO2 | Interpret the Patent writing and Development |
| | | | | | | CO3 | Describe the Procedure for Grant of Patents |
| | | | | | | CO4 | Illustrate new Developments in IPR |
| 2 | VR19 | 15 | M.Tech - Machine Design | 2015191100 | Advanced Mechanics of Solids | CO1 | Solve stress, strain calculatins |
| | | | | | | CO2 | Examine different failure criteria for different members |
| | | | | | | CO3 | Evaluate the various parameters to stop unsymmetrical bending |
| | | | | | | CO4 | Compile the torsion coming on to the machine components |
| 3 | VR19 | 15 | M.Tech - Machine Design | 2015191101 | Mechanical Vibrations and Acoustics | CO1 | Understand the basic concepts of Acoustics and Noise, noise measuring instruments and control the noise using diffrent noise control techniques |
| | | | | | | CO2 | Determine vibratory responses of SDOF systems to different excitations like harmonic, periodic and non-periodic excitation |
| | | | | | | CO3 | Obtain eigen values and eigen vectors of MDOF systems using theoretical and numerical methods |
| | | | | | | CO4 | Analyze for frequency and amplitudes of continuous systems like Bars, Beams and Shafts |
| 4 | VR19 | 15 | M.Tech - Machine Design | 2015191110 | Machine Dynamics Lab | CO1 | Calculate the damped and undamped natural frequency and amplitude of the vibrating system from experiment |
| | | | | | | CO2 | Test for the balancing of masses in static and dynamic cases |
| | | | | | | CO3 | Evaluate the magnitude of gyroscopic couple, angular velocity of precession |
| | | | | | | CO4 | Explain the Direct and Inverse kinematic of a robot |
| 5 | VR19 | 15 | M.Tech - Machine Design | 2015191111 | Design Practice Lab-I | CO1 | Classify the various types of load applications |
| | | | | | | CO2 | Decide the correct profile of the components |
| | | | | | | CO3 | Create the final dimensions of the components |
| | | | | | | CO4 | Constuct the final component in all the parameters |
| 6 | VR19 | 15 | M.Tech - Machine Design | 2015191150 | Design of Modern Vehicle Systems | CO1 | Understand the safety and conseptual design of Automobiles. design of structural elements and load analysis for different vehicles based on cornering loads |
| | | | | | | CO2 | Identify the Basic design, performance of Electric vehicles (EV), and Hybridness of vehicles and their performance . |
| | | | | | | CO3 | Understand Working Principle and Design of UAVs/Drones and their Applications,Flight controller, Remote Controller and Quadcopter dynamics. |
| | | | | | | CO4 | Analyze Safety aspects of automobiles and energy absorbing systems through testing(lab, field testing. |
| 7 | VR19 | 15 | M.Tech - Machine Design | 2015191151 | Product Design | CO1 | To understand the basic concept a product design based on the requirement. |
| | | | | | | CO2 | process. |
| | | | | | | CO3 | Make the solid model in virtual platform and evaluate the product using computer software. |
| | | | | | | CO4 | Selecting the correct process of fabrication to optimze the cost and quality. |
| 8 | VR19 | 15 | M.Tech - Machine Design | 2015191152 | Design for Manufacturing & Assembly | CO1 | Understand to relate design rules for manufacturability. |
| | | | | | | CO2 | Apply design rules for ease of machining. |
| | | | | | | CO3 | Enumerate the general design considerations for casting, casting tolerances. |
| | | | | | | CO4 | Apply design guidelines to assembly. |
| 9 | VR19 | 15 | M.Tech - Machine Design | 2015191153 | Fracture Mechanics | CO1 | Identify the prediction of mechanical failure and discuss various failure modes |
| | | | | | | CO2 | Employ the concept of griffith's analysis for energy release rate and describe the concept of stress intensity factor in linear elastic fracture mechanics. |
| | | | | | | CO3 | Analyze failure prediction parameters and crack tip opening displacement in Elastic-Plastic fracture mechanics. |
| | | | | | | CO4 | Assess the fatigue damage and creep damage and illustrate the creep-fatigue interactions. |

| S No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
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| 10 | VR19 | 15 | M.Tech - Machine Design | 2015191154 | Advanced Mechanisms | CO1 | Understand the various degreesof freedom in various linkages of mechanism |
| | | | | | | CO2 | Analyze the synthesis of mechanism using analytical methods |
| | | | | | | CO3 | Analyze the plane motion in mechanism graphically |
| | | | | | | CO4 | Evaluate the maipulator kinematics with D-H notation |
| 11 | VR19 | 15 | M.Tech - Machine Design | 2015191155 | Non-Destructive Evaluation | CO1 | Identify various surface flaws by using Liquid penetrant inspection and Magnetic particle inspection. |
| | | | | | | CO2 | Apply the systematic understanding of knowledge on radiography techniques. |
| | | | | | | CO3 | techniques. |
| | | | | | | CO4 | Summarize the various techniques of optical holography and electron beam holography. |
| 12 | VR19 | 15 | M.Tech - Machine Design | 2015191156 | Robotics | CO1 | Summarize robot components, configurations and different end effectors |
| | | | | | | CO2 | Select a robot for a given application and illustrate the working principles of various actuators and sensors that can be used in the manipulator, control system that can be used as well as the method of programming the robot |
| | | | | | | CO3 | Analyze a given manipulator kinematically and dynamically |
| | | | | | | CO4 | Derive as well as analyze the equation of trajectory that the end-effector should follow given the boundary conditions |
| 13 | VR19 | 15 | M.Tech - Machine Design | 2015191157 | Geometric Modeling | CO1 | Use various mathematical equation to represent curves. |
| | | | | | | CO2 | Apply the cubic splines in modeling of a product. |
| | | | | | | CO3 | Select appropriate synthetic curves in modeling process. |
| | | | | | | CO4 | products. |
| 14 | VR19 | 15 | M.Tech - Machine Design | 2015191158 | Multi Body Dynamics | CO1 | To meet desired needs and solve engineering problems |
| | | | | | | CO2 | Understand and implement the dynamics of the planar and spatial systems. |
| | | | | | | CO3 | Inverse dynamic analysis and forward dynamic analysis of the planar systems. |
| | | | | | | CO4 | Analyse the formulations of spatial multi body systems. |
| 15 | VR19 | 15 | M.Tech - Machine Design | 2015191159 | Vision Systems and Image Processing | CO1 | Suggest and explain the physical requriements for developing a vision system |
| | | | | | | CO2 | transformations |
| | | | | | | CO3 | Select and Explain a suitable image enhancement technique for a given image |
| | | | | | | CO4 | Summarize various image compression techniques |
| 16 | VR19 | 15 | M.Tech - Machine Design | 2015191200 | Advanced Finite Element Methods | CO1 | Understand the concepts of potential energy, Raleigh Ritz method and weighted residual methods. |
| | | | | | | CO2 | Identify the suitable FEA elements such as bars, truss, beams, constant strain triangle and isoparametric elements to create Finite Element Model with respect to the application |
| | | | | | | CO3 | Apply suitable boundary conditions to the finite element model and solve the engineering problems |
| | | | | | | CO4 | Solve problems involving dynamics and heat transfer. |
| 17 | VR19 | 15 | M.Tech - Machine Design | 2015191201 | Advanced Machine Design | CO1 | Design mechanical components by selecting a suitable material and failure criteria. |
| | | | | | | CO2 | Evaluate fatigue life of mechanical components for ductile and brittle materials |
| | | | | | | CO3 | Analyze and predict the fracture strength of mechanical components under different fracture modes |
| | | | | | | CO4 | Design mechanical components involving contacts avoiding the surface failures. |
| 18 | VR19 | 15 | M.Tech - Machine Design | 2015191210 | Computational Mathematics Lab | CO1 | Apply MATLAB and Python code for solving a system of linear equationusing using Gauss Elimination Method. |
| | | | | | | CO2 | Apply MATLAB and Python code for Iterative methods to solve equations using Jacobil teration. |
| | | | | | | CO3 | Apply MATLAB and Python code for Matrices and Eigenvalues |
| | | | | | | CO4 | Differentialequations |
| 19 | VR19 | 15 | M.Tech - Machine Design | 2015191211 | Design Practice Lab-II | CO1 | Classify the various types of load applications |
| | | | | | | CO2 | Decide the correct profile of the components |
| | | | | | | CO3 | Create the final dimensions of the components |
| | | | | | | CO4 | Constuct the final component in all the parameters |

| S No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 20 | VR19 | 15 | M.Tech - Machine Design | 2015191250 | Theory of Plasticity | CO1 | Understand the importance of yield point in the stress analysis. |
| | | | | | | CO2 | Analyze the governing equations of plasticity |
| | | | | | | CO3 | Apply principles of plasticity in the design analysis |
| | | | | | | CO4 | Develop constitutive models based on experimental results on material behavior. |
| 21 | VR19 | 15 | M.Tech - Machine Design | 2015191251 | Signal Analysis and Condition Monitoring | CO1 | Understand basic concepts of Fourier analysis, Bandwidth. Signal, and Convolution. |
| | | | | | | CO2 | Analysis of stationary signals. |
| | | | | | | CO3 | Analysis of continuous non-stationary signals. |
| | | | | | | CO4 | Apply condition monitoring in real systems. |
| 22 | VR19 | 15 | M.Tech - Machine Design | 2015191252 | Computational Fluid Dynamics | CO1 | Understand the fundamental of finite element method. |
| | | | | | | CO2 | Use the finite element method to solve fluid dynamics problems. |
| | | | | | | CO3 | Formulation the equations for incompressible and compressible flows using various avaible metyhod |
| | | | | | | CO4 | Implement finite volume method and Standard variational methods for real-life problems. |
| 23 | VR19 | 15 | M.Tech - Machine Design | 2015191253 | Composite Materials | CO1 | Understand the importance of composite materials |
| | | | | | | CO2 | Distinguish various materials used for matrix and reinforcement |
| | | | | | | CO3 | Recommend the composite material according to the application |
| | | | | | | CO4 | Modify the material according to the types of loads coming on to specimen |
| 24 | VR19 | 15 | M.Tech - Machine Design | 2015191254 | Soft Computing | CO1 | Learn about soft computing techniques and their applications |
| | | | | | | CO2 | Define the fuzzy systems |
| | | | | | | CO3 | Analyze the genetic algorithms and their applications. |
| | | | | | | CO4 | Analyze various neural network architectures |
| 25 | VR19 | 15 | M.Tech - Machine Design | 2015191255 | Experimental Techniques and data Analysis | CO1 | Clean and manipulate raw data sets so they are ready for analysis |
| | | | | | | CO2 | Determine and carry out the appropriate statistical test for a variety of experimental questions about different data sets |
| | | | | | | CO3 | Draw conclusions about whether research hypotheses have been supported by empirical data. |
| | | | | | | CO4 | Plan the statistical analysis of an independent research project |
| 26 | VR19 | 15 | M.Tech - Machine Design | 2015191256 | Design with advanced Materials | CO1 | Understand the concepts such as elasticity in materials, plastic deformation, and advanced concepts like solid solution and dispersion strengthening. |
| | | | | | | CO2 | Select the material based on cost, service, and mechanical properties using material property charts |
| | | | | | | CO3 | Analyze material characteristics of various modern metallic materials such as sual phase steels, intermetallics, and alloys. |
| | | | | | | CO4 | Evaluate the porcessing and properties of polymer based compsoite materials, smart materials, shape memory alloys. |

| S No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 27 | VR19 | 15 | M.Tech - Machine Design | 2015191257 | Mechatronics | CO1 | Understand the basic concepts behind design considerations of mechatronics systems, various actuators, and drive systems. |
| | | | | | | CO2 | Develop motion control algorithms using fuzzy logic |
| | | | | | | CO3 | machines. |
| | | | | | | CO4 | Assess the machine vision concept and various micro mechatronics systems |
| 28 | VR19 | 15 | M.Tech - Machine Design | 2015191258 | Tribology | CO1 | Illustrate the fundamentals of tribology and the tribological parameters of all classes of materials. |
| | | | | | | CO2 | Explain about various Lubrication Technquies |
| | | | | | | CO3 | failure |
| | | | | | | CO4 | Classify different types of seals and its uses |
| 29 | VR19 | 15 | M.Tech - Machine Design | 2015191259 | Experimental Modal Analysis | CO1 | Understand different modal analysis: Vibrations of single and multiple degree of freedom. |
| | | | | | | CO2 | Analyse Frequency response functions measurement. |
| | | | | | | CO3 | Understand Inverse Method, Residuals MDOF, curve-fitting procedures. |
| | | | | | | CO4 | varients. |
| 30 | VR19 | 15 | M.Tech - Machine Design | 2015191270 | Mini Project with Seminar | CO1 | Carryout literature survey, and choose a relevant topic reported in recent SCI / IEEE/ Scopus / conference publications / transactions in the domain of mechanical engineering. |
| | | | | | | CO2 | Simulate and analyze the results reported in the chosen paper for seminar topic. |
| | | | | | | CO3 | Communicate effectively before the expert panel and develop technical reports. |
| | | | | | | CO4 | audience |
| 31 | VR19 | 15 | M.Tech - Machine Design | 2015192150 | Industrial Robotics | CO1 | Summarize robot components, configurations and different end effectors |
| | | | | | | CO2 | Fourmulate the kinematics and dynamics of a mainpulator |
| | | | | | | CO3 | Write a program to manipluate the end effector of a robot to move along a specified path |
| | | | | | | CO4 | cell layout |
| 32 | VR19 | 15 | M.Tech - Machine Design | 2015192151 | Advanced Optimization Techniques | CO1 | Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems |
| | | | | | | CO2 | Use classical optimization techniques and numerical methods of optimization |
| | | | | | | CO3 | Describe the basics of different evolutionary algorithms |
| | | | | | | CO4 | Enumerate fundamentals of Integer programming technique and apply different techniques to solve various optimization problems arising from engineering areas |
| 33 | VR19 | 15 | M.Tech - Machine Design | 2015192152 | Additive Manufacturing | CO1 | Recognize the development of Additive Manufacturing technology and opportunities for transforming a concept into product development. |
| | | | | | | CO2 | Apply the suitable rapid prototyping process for a given product. |
| | | | | | | CO3 | Apply the suitable rapid tooling process for a given product. |
| | | | | | | CO4 | Explore the applications of AM processes. |
| 34 | VR19 | 15 | M.Tech - Machine Design | 2015192153 | Mechanics of Composite Materials | CO1 | Understand the importance of composite materials |
| | | | | | | CO2 | Distinguish various materials used for matrix and reinforcement |
| | | | | | | CO3 | Recommend the composite material according to the application |
| | | | | | | CO4 | Modify the material according to the types of loads coming on to specimen |
| 35 | VR19 | 15 | M.Tech - Machine Design | 2015192154 | Vehicle Dynamics | CO1 | vehicle |
| | | | | | | CO2 | vehicles |
| | | | | | | CO3 | vehicle. |
| | | | | | | CO4 | Apply the mechanical theories on the vehicle dynamics design. |
| 36 | VR19 | 15 | M.Tech - Machine Design | 2015192160 | Operations Research | CO1 | Develop the different linear programming and assignment models for domain specific situations. |
| | | | | | | CO2 | Analyze the different transportation models. |
| | | | | | | CO3 | decisions. |
| | | | | | | CO4 | Apply optimal strategy to real time applications using dynamic programming and game theory. |

| S No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 37 | VR19 | 15 | M.Tech - Machine Design | 2015192170 | Project Phase -I/ Industrial Project # | CO1 | of mechanical engineering and relevant disciplines to idenitfy solutions |
| | | | | | | CO2 | Determine suitable methodology to attain at a sustainable solutions for the identified problems. |
| | | | | | | CO3 | Design, implement, and optimize the solution to meet all the feasible requirements. |
| | | | | | | CO4 | judgments in mechanical domain based on legal and ethical principles. |
| 38 | VR19 | 15 | M.Tech - Machine Design | 2015192270 | Project Phase -II | CO1 | apply the mechanical engineering principles in planning, formulating an innovative design/ approach to chosen topic within the context of legal, societal and environment constraint. |
| | | | | | | CO2 | initiative, and providing leadership, necessary to ensure project success |
| | | | | | | CO3 | Ability to use formal and informal communications with guide, make presentations and prepare technical document. |
| | | | | | | CO4 | Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems. |

**VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)**
**DEPARTMENT OF CIVIL ENGINEERING**
**VR19 -M.Tech. Transport Engineering Course Outcomes**

| S.No | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 1 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191100 | Pavement Materials and Construction | CO1 | Understand the sequential stages involved in the construction of flexible and bituminous pavements |
| | | | | | | CO2 | Determine the optimum bitumen content by applying the bitumen mix design methods |
| | | | | | | CO3 | Assess the suitability of aggregates used in various layers of pavement. |
| | | | | | | CO4 | Identify the suitable equipment for construction of different pavements. |
| 2 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191101 | Highway Traffic Analysis and Design | CO1 | Develop a basic Knowledge of the fundamental issues in traffic engineering and understanding of the factors influencing road vehicle performance |
| | | | | | | CO2 | Understand Headways and Gap acceptance behavior |
| | | | | | | CO3 | Define the critical procedures for highway capacity and level of service analysis |
| | | | | | | CO4 | Build knowledge on traffic signal theory and elements of traffic signal Operations and design the links and intersections |
| 3 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191150 | Ground Improvement Techniques | CO1 | Decide the suiatable ground improvement method and their suitability to different field situations |
| | | | | | | CO2 | Design a reinforced earth embankment and check its stability. |
| | | | | | | CO3 | Analyze the various functions of Geosynthetics and their applications in Civil Engineering practice |
| | | | | | | CO4 | Adapt the suiatable grouting techniques for various applications |
| 4 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191151 | RS & GIS for Transportation Engineering | CO1 | Interpret various remotely sensed images with the help of acquired knowledge in remote sensing technology. |
| | | | | | | CO2 | Apply the GPS instrument in field for various applications |
| | | | | | | CO3 | Make use of the techniques of RS, GIS and GPS techniques in different transportation engineering applications. |
| | | | | | | CO4 | Extend knowledge on Intelligent Transportation systems |
| 5 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191152 | Numerical Methods and Applied Statistics | CO1 | Apply the different numerical techniques to transportation problems. |
| | | | | | | CO2 | Understand applications of probability theory |
| | | | | | | CO3 | Use regression and correlation analysis to process transportation data. |
| | | | | | | CO4 | Understand the concpets of sampling |
| 6 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191153 | Intelligent Transportation Systems | CO1 | Understand the sensor and communication technologies |
| | | | | | | CO2 | Apply the various ITS methodologies for Indian Traffic Conditions. |
| | | | | | | CO3 | Evaluate the ITS User Needs and functional areas for Indian Conditions. |
| | | | | | | CO4 | Overview of ITS implemetations in devloped countries |
| 7 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191154 | Transportation System Modeling and Simulation | CO1 | Develop an understanding of the fundamentals of pavement modelling processes |
| | | | | | | CO2 | Extend knowledge on the Key Relationships and physical laws of models |
| | | | | | | CO3 | Build knowledge on growth and decay processes |
| | | | | | | CO4 | Distinguish between virtual and real problems related to various simulation processes |

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| 8 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191155 | Bridge Engineering | CO1 | Prepare a detailed project report for the construction of bridge giving hydraulic particulars ofthe river and soil details and be able to select the suitable site and type of the bridge |
| | | | | | | CO2 | Design various types of bridges like Culvert, Slab Bridge and T-beam Bridge using provisionsof IRC |
| | | | | | | CO3 | Design pier, abutment, foundations, bearing and detailing of joints |
| | | | | | | CO4 | Prioritize the best type of maintenance to be applied to different defects in bridges |
| 9 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191110 | Highway Aggregates and Soil Testing Lab | CO1 | Develop knowledge of regarding the quality behavior of sub-grade soils |
| | | | | | | CO2 | Analyze the quality behavior of road aggregates |
| | | | | | | CO3 | Utilize aggregate and bitumen properties in pavement design |
| | | | | | | CO4 | Determine the strength characterictes of subgrade soils. |
| 10 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191111 | Bituminous Testing and Pavement Evaluation Lab | CO1 | Develop Knowledge on types of bitumen and their quality behavior |
| | | | | | | CO2 | Utilize aggregate and bitumen properties in pavement design |
| | | | | | | CO3 | Examine the unevenness of existing pavements |
| | | | | | | CO4 | Develop Knowledge on mix design of Flexible pavements |
| 11 | VR19 | 22 | M.Tech-Transportation Engineering | 2000191130 | Research Methodology and IPR | CO1 | Identify research problem. |
| | | | | | | CO2 | Find solutions for research problem |
| | | | | | | CO3 | Explore on various IPR components and process of filing. |
| | | | | | | CO4 | Understand the adequate knowledge on patent and rights |
| 12 | VR19 | 22 | M.Tech-Transportation Engineering | 2000191131 | Soft Skills | CO1 | learn to connect and work with others to achieve a set task |
| | | | | | | CO2 | Assess the requirements of a task |
| | | | | | | CO3 | Identify the strengths within the team |
| | | | | | | CO4 | utilize the diverse skills of the group to achieve the set objective, awareness of risk/safety |
| 13 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191200 | Pavement Analysis and Design | CO1 | Understand the components of rigid and flexible pavements |
| | | | | | | CO2 | Know the stresses, strains and deflections in rigid and flexible pavements |
| | | | | | | CO3 | Know the traffic loading; and material characterization. |
| | | | | | | CO4 | Design methodologies for both rigid and flexible pavements |
| 14 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191201 | Transportation Planning | CO1 | Build knowledge on traveler choices on mode of travel and route choice |
| | | | | | | CO2 | Understand urban activity system and travel patterns |
| | | | | | | CO3 | Evaluate four stage travel demand modelling in transportation network planning |
| | | | | | | CO4 | Clasify the study zones and varioues methods of data collection subjected to urban transportation planning |
| 15 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191250 | Traffic Flow Theory | CO1 | Analyze the traffic stream parameters |
| | | | | | | CO2 | Apply the queuing theory to find the cogestion problem. |
| | | | | | | CO3 | Define the significance of ITS under Indian conditionS |
| | | | | | | CO4 | study macroscopic and microscopic modelling. |
| 16 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191251 | Pavement Construction | CO1 | Understand the construction of interlocking block pavements, quality control test, and construction of various types of joints |
| | | | | | | CO2 | Understand mix design, construction control and quality control checks of stabilised pavement layers. |
| | | | | | | CO3 | Understand the structural and function failures and evaluation of pavements |
| | | | | | | CO4 | Develop pavement management systems. |

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| 17 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191252 | Aviation Infrastructure and Planning | CO1 | Demonstrate the clear understanding of the airport components |
| | | | | | | CO2 | Build knowledge on basic principles in airport components, geometric design and delays |
| | | | | | | CO3 | Build knowledge on critical factors consideration in airport grading and design. |
| | | | | | | CO4 | Develop Knowledge on air traffic control aids. |
| 18 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191253 | Port and Harbour Engineering | CO1 | Develop an understanding of overall Port and Harbour Engineering and its impact. |
| | | | | | | CO2 | Build knowledge on the Key design Characteristics for design of Elements like Groins, Breakwaters |
| | | | | | | CO3 | Extend knowledge on flow regime, lift force mechanism, bed load and suspended load and other advanced topics |
| | | | | | | CO4 | Assess the design principles and construction of jetties along with desing of off shore structures |
| 19 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191254 | Sustainable Urban and Transport Development | CO1 | Understand the importance of sustainable urban and transport planning |
| | | | | | | CO2 | Understand the sustainable urban and transport planning techniques |
| | | | | | | CO3 | Understand the benefits of human community |
| | | | | | | CO4 | Evaluate the economic, financial and pricing of sustainiable transport |
| 20 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191255 | Environmental Impact Assessment | CO1 | Able to prepare and evaluate EIA reports |
| | | | | | | CO2 | Identify risks and impacts of the projects |
| | | | | | | CO3 | Selection of an appropriate EIA methodology |
| | | | | | | CO4 | Estimate the cost benefit ratio of the project. |
| 21 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191210 | Traffic Engineering Laboratory | CO1 | Analyze the traffic flow and parking characteristics |
| | | | | | | CO2 | Determine the capacity and saturation flow of the road network. |
| | | | | | | CO3 | Design traffic signal contral system for given intersection. |
| | | | | | | CO4 | Develop Knowledge on to solve complex traffic problems with definite solutions. |
| 22 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191211 | Transportation Simulation Lab | CO1 | Build knowledge on quality behavior of hetrogenous traffic flow. |
| | | | | | | CO2 | Develop simulation models for various traffic and geometric conditions in Indian conditions. |
| | | | | | | CO3 | Interprit the simulation to find suitable solutions. |
| | | | | | | CO4 | Apply simlulation results to plan and design complex transportation network. |
| 23 | VR19 | 22 | M.Tech-Transportation Engineering | 2000191230 | Constitution of India | CO1 | Understand historical background of the constitution making and its importance for building a democratic India. |
| | | | | | | CO2 | Understand the functioning of three wings of the government ie., executive, legislative and judiciary. |
| | | | | | | CO3 | Familiarise the value of the fundamental rights and duties for becoming good citizen of India. |
| | | | | | | CO4 | Analyze the decentralization of power between central, state and local self-government. |
| 24 | VR19 | 22 | M.Tech-Transportation Engineering | 2022191270 | Mini Project with Seminar | CO1 | Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to idenitfy solutions |
| | | | | | | CO2 | Determine suitable methodology to attain at a sustainable solutions for the identified problems. |
| | | | | | | CO3 | Design, implement, and optimize the solution to meet all the feasible requirements. |
| | | | | | | CO4 | Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles. |
| 25 | VR19 | 22 | M.Tech-Transportation Engineering | 2022192150 | Finacial and Ecoomic Analysis of trnasportation Porjects | CO1 | Understand the concepts of decision making |
| | | | | | | CO2 | Calculate transportation demand and supply with estimation of vehicle operating cost and accident cost |
| | | | | | | CO3 | Perform economic analysis of transportation project |
| | | | | | | CO4 | Applying varies financial methods in road projects. |

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| 26 | VR19 | 22 | M.Tech-Transportation Engineering | 2022192151 | Highway Safety Engineering | CO1 | Understand causes of accidents and carryout statistical analysis of accident data. |
| | | | | | | CO2 | Apply road safety technique in the construction of new roads. |
| | | | | | | CO3 | Explain road reconstruction principle and improvement of road considering the different components of road and intersections. |
| | | | | | | CO4 | Emphasize on road safety auditing principle and procedures; analyse the effectiveness of various traffic management techniques. |
| 27 | VR19 | 22 | M.Tech-Transportation Engineering | 2022192152 | Computational Techniques in Transportation Engineering | CO1 | Understand the introdcution to systems approach |
| | | | | | | CO2 | A working knowledge of simulation and GPSS programming |
| | | | | | | CO3 | A good understanding of GA applications |
| | | | | | | CO4 | The ability to apply ANN |
| 28 | VR19 | 22 | M.Tech-Transportation Engineering | 2022192160-A | Waste water Management | CO1 | Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation |
| | | | | | | CO2 | Impart knowledge on selection of treatment methods for industrial wastewater. |
| | | | | | | CO3 | Describe the common methods of treatment in different industries |
| | | | | | | CO4 | Design of wastewater treatment plant for the given sewage characteristics |
| 29 | VR19 | 22 | M.Tech-Transportation Engineering | 2022192160-B | Environmental Impact Assessment | CO1 | Understand evaluate and create the basic concept of environmental impact assessment, Flow of EIA, Types of environmental Impacts |
| | | | | | | CO2 | Implement different methods in preparing an Environmental Impact Statement |
| | | | | | | CO3 | Identify various mitigation measures that can be used. |
| | | | | | | CO4 | Access environmental impacts and indicate their potential risks through environmental indices and indicators |
| 30 | VR19 | 22 | M.Tech-Transportation Engineering | 2022192170 | Dissertation –I/Industrial Project | CO1 | Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to idenitfy solutions |
| | | | | | | CO2 | Determine suitable methodology to attain at a sustainable solutions for the identified problems. |
| | | | | | | CO3 | Design, implement, and optimize the solution to meet all the feasible requirements. |
| | | | | | | CO4 | Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles. |
| 31 | VR19 | 22 | M.Tech-Transportation Engineering | 2022192270 | Dissertation Phase -II | CO1 | Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to idenitfy solutions |
| | | | | | | CO2 | Determine suitable methodology to attain at a sustainable solutions for the identified problems. |
| | | | | | | CO3 | Design, implement, and optimize the solution to meet all the feasible requirements. |
| | | | | | | CO4 | Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles. |

## VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)
## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
### VR19 - M.Tech - Software Engineering Course Ourcomes

| S NO | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|
| 1 | 25 | M.Tech-Software Engineering | 2025191100 | Software Engineering | CO1 | Analyze software development process models and their suitability to industrial applications. |
| | | | | | CO2 | Develop SRS document for software design. |
| | | | | | CO3 | Employ software architectural styles to design user interface. |
| | | | | | CO4 | Compare software testing approaches and aspects. |
| 2 | 25 | M.Tech-Software Engineering | 2025191101 | Advanced Data Structures | CO1 | Compare linear and non linear data structures |
| | | | | | CO2 | Implement searching, sorting and traversing methods |
| | | | | | CO3 | Implement priority queues using Binary heap |
| | | | | | CO4 | Analyze algorithms for Height balanced trees like AVL trees, red-black trees, B-trees and Splay trees. |
| 3 | 25 | M.Tech-Software Engineering | 2025191150 | Software Project and Process Management | CO1 | To understand the basic concepts and issues of software project management |
| | | | | | CO2 | To conduct activities necessary to successfully complete and close the Software projects |
| | | | | | CO3 | To implement the project plans through managing people, communications and change |
| | | | | | CO4 | To develop the skills for tracking and controlling software deliverables |
| 4 | 25 | M.Tech-Software Engineering | 2025191151 | Machine Learning | CO1 | Demonstrate on Supervised and Computational Learning |
| | | | | | CO2 | Analyze on Statistics in learning techniques and Logistic Regression |
| | | | | | CO3 | Illustrate on Support Vector Machines and Perceptron Algorithm |
| | | | | | CO4 | Design a Multilayer Perceptron Networks and classification of decision tree |
| 5 | 25 | M.Tech-Software Engineering | 2025191152 | E-Commerce | CO1 | Understand the basic concepts of E-commerce |
| | | | | | CO2 | Demonstrate an retailing in E-commerce by using the effectiveness of market research |
| | | | | | CO3 | Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra organizational |
| | | | | | CO4 | Describe about Consumer Search and Resource Discovery |
| 6 | 25 | M.Tech-Software Engineering | 2025191153 | Software Quality Assurance and Testing | CO1 | Describe various standards used for Software Quality Assurance |
| | | | | | CO2 | Explain fundamental concepts in software quality (e.g., internal / external quality, as well as quality in use) and quality assurance models. |
| | | | | | CO3 | Name and describe different testing techniques and approaches |
| | | | | | CO4 | Compare various Automation tools used for Software Testing |
| 7 | 25 | M.Tech-Software Engineering | 2025191154 | Cloud Computing | CO1 | Differentiate among various cloud offerings, cloud environments, distributed technologies |
| | | | | | CO2 | Analyze various cloud platforms and cloud applications. |
| | | | | | CO3 | Survey the policies and mechanisms for resource management, performance, scheduling |
| | | | | | CO4 | Choose among different storage technologies for cloud like DFS, GFS, HDFS, S#, Big Table. |
| 8 | 25 | M.Tech-Software Engineering | 2025191155 | Internet of Things | CO1 | Enumerate the list of IoT Applications |
| | | | | | CO2 | Evaluate different IoT application architectures |
| | | | | | CO3 | Construct IoT applications with Cloud for data analytics |
| | | | | | CO4 | Chose a real world commercial platform for deploying IoT Applications |
| 9 | 25 | M.Tech-Software Engineering | 2000191100 | Research Methodology and IPR | CO1 | Discuss the process used for research Problem selection and Research Paper Writing |
| | | | | | CO2 | Interpret the Patent writing and Development |
| | | | | | CO3 | Describe the Procedure for Grant of Patents |
| | | | | | CO4 | Illustrate new Developments in IPR |

| S NO | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|
| 10 | 25 | M.Tech-Software Engineering | 2025191110 | Advanced Data Structures Lab | CO1 | Identify classes, objects, members of a class and relationships among them needed for a specific problem. |
| | | | | | CO2 | Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked lists, graphs and trees.) |
| | | | | | CO3 | Apply and analyze functions of Dictionary |
| | | | | | CO4 | Implement Programs on Hashing |
| 11 | 25 | M.Tech-Software Engineering | 2025191111 | SE LAB-I | CO1 | Demonstrate the constructs of Ruby scripting Language, use of Perl language elements |
| | | | | | CO2 | Implement PERL program to connect to MySQL database |
| | | | | | CO3 | Implement Map Reduce Program for weather data |
| | | | | | CO4 | Implement PHP program for cotactuspage. |
| 12 | 25 | M.Tech-Software Engineering | 2000191130 | Soft skills (Audit course) | CO1 | Teamwork – learning to connect and work with others to achieve a set task. |
| | | | | | CO2 | Leadership – assessing the requirements of a task, identifying the strengths within the team, utilizing the diverse skills of the group to achieve the set objective, awareness of risk/safety. |
| 13 | 25 | M.Tech-Software Engineering | 2000191130 | Disaster Management (Audit course) | CO1 | learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response. |
| | | | | | CO2 | critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. |
| | | | | | CO3 | develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. |
| | | | | | CO4 | critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries |
| 14 | 25 | M.Tech-Software Engineering | 2000191130 | Pedagogy Studies (Audit course) | CO1 | What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries? |
| | | | | | CO2 | What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners? |
| | | | | | CO3 | How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? |
| 15 | 25 | M.Tech-Software Engineering | 2000191130 | Stress Management By Yoga (Audit course) | CO1 | Develop healthy mind in a healthy body thus improving social health also |
| | | | | | CO2 | Improve efficiency |
| 16 | 25 | M.Tech-Software Engineering | 2025191200 | Service Oriented Architecture | CO1 | Creation of SOA compliant web service using various technologies. |
| | | | | | CO2 | Make use of variousservice oriented analysis techniques also understand the technology underlying the service design. |
| | | | | | CO3 | Demonstrate on basic concepts of SOA and it differs with other architectures |
| | | | | | CO4 | Organize advanced concepts of service composition, Orchestration and Choreography. Understanding of web service framework with respect to SOA. |
| 17 | 25 | M.Tech-Software Engineering | 2025191201 | Mathematical Foundations of Computer Science | CO1 | Design mathematical logic with Propositional Calculus and Predicate Calculus. |
| | | | | | CO2 | Assume mathematical principles and logics to solve real time problems. |
| | | | | | CO3 | Apply graph theory for real time problems like network routing problem. |
| | | | | | CO4 | Examine Principles of Inclusion–Exclusion, Pigeonhole Principle and its Application and Apply Recurrence Relations by Substitution and Generating Functions. |

| S NO | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|
| 18 | 25 | M.Tech-Software Engineering | 2025191250 | Software Testing Methodologies | CO1 | Examine Taxonomy of Bugs, Basics Concepts of Path Testing and theme of testing. |
| | | | | | CO2 | Illustrate Domain testing and Interface Testing. |
| | | | | | CO3 | Organize Logic Based Testing, Graph Matrices and apply node reduction algorithm |
| | | | | | CO4 | Identify the needs of software test automation and develop a test tool to support test automation. |

| S NO | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
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| 19 | 25 | M.Tech-Software Engineering | 2025191251 | Agile Software Development | CO1 | Summarize the agile methodologies: extreme programming, scrum, and feature driven programming. |
| | | | | | CO2 | Apply The Twelve XP Practices and Illustrate pair programming and its characteristics |
| | | | | | CO3 | Apply XP to a small project. |
| | | | | | CO4 | Examine Feature-Driven Development and Regaining Control |
| 20 | 25 | M.Tech-Software Engineering | 2025191252 | ERP & Supply Chain Management | CO1 | Construct a model to generate forecasts for a company's products. |
| | | | | | CO2 | Develop a Business Modules by using fundamentals Supply chain Management. |
| | | | | | CO3 | Apply Supply chain strategies and list the performance Metrics. |
| | | | | | CO4 | Develop an aggregate production plan with relevant deterministic and stochastic inventory models. |
| 21 | 25 | M.Tech-Software Engineering | 2025191253 | Secure Software Engineering | CO1 | Explain the Properties of Secure Software and Specify Desired Security Properties. |
| | | | | | CO2 | Incorporate requirements into secured software development process |
| | | | | | CO3 | Apply secure design principles for developing attack resistant software |
| | | | | | CO4 | Analyze the Security and complexity of system drivers. |
| 22 | 25 | M.Tech-Software Engineering | 2025191254 | Big Data Analytics | CO1 | Illustrate on big data and its use cases from selected business domains. |
| | | | | | CO2 | Interpret and summarize on No SQL, Cassandra |
| | | | | | CO3 | Analyze the HADOOP and Map Reduce technologies associated with big data analytics and explore on Big Data applications Using Hive. |
| | | | | | CO4 | Make use of Apache Spark, RDDs etc. to work with datasets. |
| 23 | 25 | M.Tech-Software Engineering | 2025191255 | Design patterns | CO1 | Identify the appropriate design patterns to solve object oriented design problems. |
| | | | | | CO2 | Develop design solutions using creational patterns. |
| | | | | | CO3 | Apply structural patterns to solve design problems. |
| | | | | | CO4 | Construct design solutions by using behavioural patterns. |
| 24 | 25 | M.Tech-Software Engineering | 2025191210 | Software Testing Lab | CO1 | Demonstrate a wide range of techniques including testing, test case coverage determination and Software quality factor. |
| | | | | | CO2 | Choose the existing testing techniques are most effective for vulnerability detection. |
| | | | | | CO3 | Design test planning and Examine the test process |
| | | | | | CO4 | Prepare test plan and develop test case hierarchy |
| 25 | 25 | M.Tech-Software Engineering | 2025191211 | SE Lab-II | CO1 | Creating applications for Big Data analytics |
| | | | | | CO2 | Building a complete business data analytic solution |
| | | | | | CO3 | Understand how design patterns solve design problems |
| | | | | | CO4 | Develop design solutions using creational patterns, structural and behavioural patterns |
| 26 | 25 | M.Tech-Software Engineering | 2025191270 | Constitution of India (Audit Course) | CO1 | Have general knowledge and legal literacy and thereby to take up competitive examinations. |
| | | | | | CO2 | Understand state and central policies, fundamental uties. |
| | | | | | CO3 | Understand Electoral Process, special provisions. |
| | | | | | CO4 | Understand powers and functions of Municipalities, Panchayats and Cooperative Societies |
| 27 | 25 | M.Tech-Software Engineering | 2025191270 | Sanskrit For Technical Knowledge | CO1 | Understanding basic Sanskrit language |
| | | | | | CO2 | Ancient Sanskrit literature about science & technology can be understood Being a logical language will help to develop logic in |
| 28 | 25 | M.Tech-Software Engineering | 2025191270 | Value Education (Audit Course) | CO1 | Knowledge of self-development |
| | | | | | CO2 | Learn the importance of Human values 3.Developing the overall personality |
| 29 | 25 | M.Tech-Software Engineering | 2025191270 | Personality Development Through Life Enlightenment Skills (Audit | CO1 | Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life |
| | | | | | CO2 | The person who has studied Geeta will lead the nation and mankind to peace and prosperity Study of Neetishatakam will help in developing versatile personality of students |

| S NO | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|
| 30 | 25 | M.Tech-Software Engineering | 2000191230 | Mini Project with Seminar | CO1 | Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of computer science and engineering. |
| | | | | | CO2 | Simulate and analyze the results reported in the chosen paper for seminar topic. |
| | | | | | CO3 | Communicate effectively before the expert panel and develop technical reports. |
| | | | | | CO4 | Respond to the queries raised by the evaluation committee and audience |
| 31 | 25 | M.Tech-Software Engineering | 2025192150 | Object Oriented Software Engineering | CO1 | Analyze of a formally specified problem statement with Modeling Concepts. |
| | | | | | CO2 | Examine Project Organization, Communication and analysis Concepts. |
| | | | | | CO3 | Produce appropriate System Design, object design of reusable Activities |
| | | | | | CO4 | Apply skills relevant for Mapping Models to Code, Configuration and project Management |
| 32 | 25 | M.Tech-Software Engineering | 2025192151 | Artificial Intelligence | CO1 | Select a search algorithm for a problem and characterize its time and space complexities. |
| | | | | | CO2 | Experiment with knowledge using the appropriate techniques for Logic concepts |
| | | | | | CO3 | Develop knowledge representation using semantic network, semantic web and List advanced techniques of knowledge representation. |
| | | | | | CO4 | Apply AI techniques to solve problems of Expert Systems |
| 33 | 25 | M.Tech-Software Engineering | 2025192160 | MOOCS | CO1 | Connect openly on a global scale, with global learners and instructors. |
| | | | | | CO2 | Develop high quality learning using multimedia platform. |
| | | | | | CO3 | Self assessment of their performance and learning process. |
| | | | | | CO4 | Develop a lifelong learning culture and updating the knowledge according with emerging trends. |
| 34 | 25 | | 2025192152 | User Interface Design | CO1 | Analyze a user interface from a communication perspective with graphical user interface. |
| | | | | | CO2 | Discuss the nature of the design process. |
| | | | | | CO3 | Select an appropriate interaction design pattern for Screen Designing. |
| | | | | | CO4 | Demonstrate on selection of window and Components. |
| 35 | 25 | M.Tech-Software Engineering | 2025192170 | Dissertation-I | CO1 | apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint. |
| | | | | | CO2 | Ability to perform individually accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success |
| | | | | | CO3 | Ability to use formal and informal communications with guide, make presentations and prepare technical document. |
| | | | | | CO4 | Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems |
| 36 | 25 | M.Tech-Software Engineering | 2025192270 | Dissertation-II | CO1 | apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint. |
| | | | | | CO2 | Ability to perform individually accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success |
| | | | | | CO3 | Ability to use formal and informal communications with guide, make presentations and prepare technical document. |
| | | | | | CO4 | Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems |

## VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)
## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
## VR19 - M.Tech. DECS Course Outcomes

| S.NO | Regulation | Programme Code | Programme Name | Course Code | Course Name | COs | Course Outcomes (COs):Upon completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 1 | VR19 | 38 | M.Tech - DECS | 2038191100 | Digital System Design | CO1 | Understand the basic concepts of a Karnaugh Map ("K-map") for a 2-, 3-, 4-, or 5-variable logic function and to identify the prime implicates, essential prime implicates, and nonessential prime implicates of a function depicted on a K-map.Perform the minimization of a Boolean function using tabular method, QM algorithm and CAMP algorithm and determine the Adjacencies, DA, CSC, SSMs, EPCs and SPCs. |
| | | | | | | CO2 | Perform the minimization of PLA using IISc algorithm and folding using COMPACT algorithm. |
| | | | | | | CO3 | Design a digital circuit by steps involving ASM chart and understand the digital system design approaches using CPLDs, FPGAs and ASICs. |
| | | | | | | CO4 | Rectify a single fault and multiple faults in combinational circuits using Path sensitization method, Boolean difference method and Kohavi algorithm and also perform fault diagnosis in sequential |
| 2 | VR19 | 38 | M.Tech - DECS | 2038191101 | Digital Data Communication | CO1 | Model digital communication system using appropriate mathematical techniques (error probability, constellation diagrams, pharos diagrams). |
| | | | | | | CO2 | Understanding the basic concepts of how digital data is transferred across computer networks. Independently understand basic computer network technology. |
| | | | | | | CO3 | Understand and explain Data Communications System and its components and identification of the different types of network topologies and protocols. |
| | | | | | | CO4 | Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer. Identify the different types of network devices and their functions within a network and finally network design and implementation. |
| 3 | VR19 | 38 | M.Tech - DECS | 2038191150 | Transform Techniques | CO1 | learn basics of two-dimensional transforms. |
| | | | | | | CO2 | Understand the definition, properties and applications of various two-dimensional transform. |
| | | | | | | CO3 | Understand the basic concepts of wavelet transform. |
| | | | | | | CO4 | Understand the special topics suchas wavelet packets,Bi-orthogonal wavelets e.t.c. |
| 4 | VR19 | 38 | M.Tech - DECS | 2038191151 | VLSI Technology and Design | CO1 | Review of FET fundamentals for VLSI design. |
| | | | | | | CO2 | To acquires knowledge about stick diagrams and layouts. |
| | | | | | | CO3 | EnabletodesignthesubsystemsbasedonVLSIconcepts |
| | | | | | | CO4 | Analyse the floor planning methods |
| 5 | VR19 | 38 | M.Tech - DECS | 2038191152 | Radar Signal Processing | CO1 | UnderstandtheoperationofRadarandcharacteristicsofMatchedfilter fornon-whitenoise. |
| | | | | | | CO2 | Know the significance and types of pulse compression techniques for analog and digital signals and phase coding in Radar and various polyphase codes used for phase coding. |
| 6 | VR19 | 38 | M.Tech - DECS | 2038191153 | Statistical Signal Processing | CO1 | Generalize the properties of statistical models in the analysis of signals using Stochastic processes. |
| | | | | | | CO2 | Differentiate the prominence of various spectral estimation techniques for Achieving higher resolution in the estimation of power spectral density. |
| | | | | | | CO3 | Outline various parametric estimation methods to accomplish the signal modeling even at higher order statistics. |
| | | | | | | CO4 | Design and development of optimum filters using classical and adaptive algorithms. |

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| 7 | VR19 | 38 | M.Tech - DECS | 2038191154 | Optical Communication Technology | CO1 | Able to analyze characteristics of optical fiber and signal propagation through optical fibers |
| | | | | | | CO2 | Know the commonly used components and subsystems in optical communication and network systems ,Working principle of optical communication components ,amplifiers, filters |
| | | | | | | CO3 | Analyze Transmission system model |
| | | | | | | CO4 | Understand the importance of wavelength division multiplexing (WDM) and de-multiplexing, |
| 8 | VR19 | 38 | M.Tech - DECS | 2038191155 | Network Security & Cryptography | CO1 | Identify and utilize different forms of cryptography techniques. |
| | | | | | | CO2 | Incorporate authentication and security in the network applications. |
| | | | | | | CO3 | Distinguish among different types of threats to the system and handle the same. |
| | | | | | | CO4 | Analyze and design hash and MAC algorithms, and digital signatures. |
| 9 | VR19 | 38 | M.Tech - DECS | 2038191110 | System Design Using VHDL Lab | CO1 | Identify, formulate, solve and implement problems in signal processing, communication systemsetc using RTL design tools. |
| | | | | | | CO2 | Use EDA tools like Cadence, Mentor Graphics and Xilinx. |
| | | | | | | CO3 | Design different digital circuits and simulate using Xilinx |
| | | | | | | CO4 | Apply verilog programming tools to implement different applications. |
| 10 | VR19 | 38 | M.Tech - DECS | 2038191111 | Data Communication s Lab | CO1 | Understand the basics of data communication, networking, internet and their importance. |
| | | | | | | CO2 | Analyze the services and features of various protocol layers in data networks. |
| | | | | | | CO3 | Differentiate wired and wireless computer networks |
| | | | | | | CO4 | Analyse TCP/IP and their protocols. |
| 11 | VR19 | 38 | M.Tech - DECS | 2000191100 | Research Methodology and IPR | CO1 | Understandresearchproblemformulation and analyzeresearch relatedinformationFollowresearchethics |
| | | | | | | CO2 | Understand that today"s world is controlled by Computer, Information Technology, buttomorrowworldwill beruled byideas, concept, andcreativity. |
| | | | | | | CO3 | Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular. |
| | | | | | | CO4 | Understand that IPR protection provides an incentive to inventors for further research work and investment in R&D,which leads to creation of new and better products, and inturn brings about, economic growth and social benefits. |
| 12 | VR19 | 38 | M.Tech - DECS | 2000191130 | Soft Skills (Audit course 1) | CO1 | prepare project title. |
| | | | | | | CO2 | prepare a project report. |
| | | | | | | CO3 | Identify gaps in literature. |
| | | | | | | CO4 | Improve writing and presentation skills of the project . |
| 13 | VR19 | 38 | M.Tech - DECS | 2038191200 | Image and video processing | CO1 | Know digital image, representation of digital image, importance of image resolution, applications in image processing, the advantages of representation of digital images in transform domain, application of various image transforms. |
| | | | | | | CO2 | Understand and analyze the image enhancement and image degradation, image restoration techniques using spatial filters and frequency domain. |
| | | | | | | CO3 | Understand and analyze the detection of point, line and edges in images, edge linking and various segmentation techniques and the redundancy in images, various image compression techniques. |
| | | | | | | CO4 | Describe the video technology from analog color TV systems to digital video systems, how video signal is sampled and filtering operations in video processing as well as describing the general methodologies for 2D motion estimation, various coding used in video processing. |
| 14 | VR19 | 38 | M.Tech - DECS | 2038191201 | Wireless Communication s and Networks | CO1 | UnderstandCellularcommunicationconcepts |
| | | | | | | CO2 | Studythemobileradiopropagation |
| | | | | | | CO3 | Studythewireless networkdifferent typeof MAC protocols |
| | | | | | | CO4 | Determine the type and appropriate model of wireless fading channel based on the system parameters and the property of the wireless medium. |

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| 15 | VR19 | 38 | M.Tech - DECS | 2038191250 | CMOS Analog & Digital IC Design | CO1 | Analyze, design, optimize and simulate analog and digital circuits using CMOS constrained by the design metrics. |
| | | | | | | CO2 | Connect the individual gates to form the building blocks of asystem. |
| | | | | | | CO3 | Use EDA tools like Cadence, Mentor Graphics and other open source software tools like Ngspice. |
| | | | | | | CO4 | Design Analog and digital circuits using CMOS |
| 16 | VR19 | 38 | M.Tech - DECS | 2038191251 | Advanced Computer Architecture | CO1 | Understand parallelism and pipelining concepts, the design aspects and challenges. |
| | | | | | | CO2 | Evaluate the issues in vector and array processors. |
| | | | | | | CO3 | Study and analyze the high performance scalable multithreaded and multiprocessor systems |
| | | | | | | CO4 | Interpret the different architecture models |
| 17 | VR19 | 38 | M.Tech - DECS | 2038191252 | Soft Computing Techniques | CO1 | Understand the basic concepts of Artificial neural network systems as well as understand the McCulloch-Pitts neuron model, simple and multilayer Perception, Adeline and Madeline concepts. |
| | | | | | | CO2 | Data processing, Hopfield and self-organizing network and difference between crisp sets to fuzzy sets, fuzzy models, fuzzification, inference, membership functions, rule based approaches and defuzzification and Self – organizing fuzzy logic control, non linear time delay systems. |
| | | | | | | CO3 | Understand the concept of Genetic Algorithm steps. Tabu, anD-colony search techniques for solving optimization problems. |
| | | | | | | CO4 | GA applications to power system optimization problems, identification and control of linear and nonlinear dynamic systems using MATLAB-Neural network toolbox and also know the application and importance stability analysis |
| 18 | VR19 | 38 | M.Tech - DECS | 2038191253 | Cyber Security | CO1 | Analyze and evaluate the cyber security needs of an organization. |
| | | | | | | CO2 | Conduct a cyber security risk assessment. |
| | | | | | | CO3 | Measure the performance and troubleshoot cyber security systems. |
| | | | | | | CO4 | Implement cyber security solutions. |
| 19 | VR19 | 38 | M.Tech - DECS | 2038191254 | DSP Processors and Architectures | CO1 | Understand the basics concepts of Digital Signal Processing (DSP) and transforms. |
| | | | | | | CO2 | Distinguish between the architectural features of General purpose processors and Programmable DSP processors |
| | | | | | | CO3 | Understand the architectures of TMS320C54xx devices. |
| | | | | | | CO4 | Understand the architectures of ADSP 2100 DSP devices and Black fin Processor and interfacing various devices to DSP Processors as well as able to write simple assembly language programs using instruction set of TMS320C54xx. |
| 20 | VR19 | 38 | M.Tech - DECS | 2038191255 | EMI/EMC | CO1 | Understand the electromagnetic environment the definitions of EMI and EMC, history of EMI some examples of practical experiences due to EMI such as mains power supply, switches and relays etc. |
| | | | | | | CO2 | Understand the celestial electromagnetic noise the occurrence of lightning discharge and their effects, the charge accumulation and discharge in an electrostatic discharge, model ESD wave form, the various cases of nuclear explosion and the transients. |
| | | | | | | CO3 | Understand the methods to measure RE and RS in the open are test sites |
| | | | | | | CO4 | Understand the measurement facilities and procedures using anechoic chamber, TEM cell, reverberating chamber GTEM cell. |
| 21 | VR19 | 38 | M.Tech - DECS | 2038191256 | Object Oriented Programming | CO1 | The model of object oriented programming: abstract data types, encapsulation, inheritance and polymorphism |
| | | | | | | CO2 | Fundamental features of an object oriented language like Java: object classes and interfaces, exceptions and libraries of object collections |
| | | | | | | CO3 | How to take the statement of a business problem and from this determine suitable logic for solving the problem; then be able to proceed to code that logic as a program written in Java. |
| | | | | | | CO4 | How to test, document and prepare a professional looking package for each business project using java doc. |

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| 22 | VR19 | 38 | M.Tech - DECS | 2038191210 | Advanced Communications Lab | CO1 | Identify the different types of network devices and their functions within anetwork. |
| | | | | | | CO2 | Understand and build the skills of sub-netting and routingmechanisms. |
| | | | | | | CO3 | Understand basic protocols of computer networks, and how they can be used to assist in network design andimplementation |
| | | | | | | CO4 | Implement the digital filters using DSP Trainer kit |
| 23 | VR19 | 38 | M.Tech - DECS | 2038191211 | Advanced Image Processing Lab | CO1 | Perform and analyze image and video enhancement and restoration |
| | | | | | | CO2 | Perform and analyze image and video segmentation and compression |
| | | | | | | CO3 | work and process viz., detection, extraction on the image/video |
| | | | | | | CO4 | Extract the information from the image using boundary and regional features. |
| 24 | VR19 | 38 | M.Tech - DECS | 2038191238 | Mini Project(Seminar) | CO1 | Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach. |
| | | | | | | CO2 | Reproduce, improve and refine technical aspects for engineering projects. |
| | | | | | | CO3 | Work as an individual or in a team in development of technical projects. |
| | | | | | | CO4 | Communicate and report effectively project related activities and findings. |
| 25 | VR19 | 38 | M.Tech - DECS | 2000191230 | Constitution of India (Audit course) | CO1 | Have general knowledge and legal literacy and thereby to take up competitive examinations. |
| | | | | | | CO2 | Understand state and central policies, fundamental duties. |
| | | | | | | CO3 | Understand Electoral Process, special provisions. |
| | | | | | | CO4 | Understand powers and functions of Municipalities, Panchayats and Cooperative Societies |
| 26 | VR19 | 38 | M.Tech - DECS | 2038192150 | Detection & Estimation Theory | CO1 | Understand the mathematical background of signal detection an destination |
| | | | | | | CO2 | Use classical and Bayesian approaches to formulate and solve problems for signal detection and parameter estimation from noisy signals. |
| | | | | | | CO3 | Derive and apply filtering methods for parameter estimation. |
| | | | | | | CO4 | Estimate the Parameters of Random Processes from Data |
| 27 | VR19 | 38 | M.Tech - DECS | 2038192151 | Advanced Digital Signal Processing | CO1 | Understand theory of different filters andalgorithms |
| | | | | | | CO2 | Understand theory of multirate DSP, solve numerical problems and writealgorithms |
| | | | | | | CO3 | Understand theory of prediction and solution of normalequations |
| | | | | | | CO4 | Estimate the Parametric Methods of Power Spectrum |
| 28 | VR19 | 38 | M.Tech - DECS | 2038192152 | Coding Theory and Applications | CO1 | Learning the measurement of information and errors. |
| | | | | | | CO2 | Obtain knowledge in designing Linear Block Codes and Cyclic codes. |
| | | | | | | CO3 | Construct tree and trellies diagrams for convolution codes |
| | | | | | | CO4 | Design the Turbo codes and Space time codes and also their applications |
| 29 | VR19 | 38 | M.Tech - DECS | 2038192160 | MOOCs-2 | CO1 | Connect openly on a global scale, with global learners and Instructors |
| | | | | | | CO2 | Develop high quality learning using multimedia platform |
| | | | | | | CO3 | Self assesment of their performance and learning process. |
| | | | | | | CO4 | Adapt a life long learning culture and updating the knowledge according with emerging trends |
| 33 | VR19 | 38 | M.Tech - DECS | 2038192138 | Dissertation Phase -I | CO1 | Apply knowledge of Electronics and communication engineering fundamentals to solve the complex Engineering problems |
| | | | | | | CO2 | Design prototypes and solutions to solve the specific needs related with public health, safety, society and environment leading to sustainable development following ethical values |
| | | | | | | CO3 | Adapt appropriate techniques, resources and modern engineering tools during the implementation of project |
| | | | | | | CO4 | Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and self-development |
| 34 | VR19 | 38 | M.Tech - DECS | 2038192238 | Dissertation Phase -II | CO1 | Apply knowledge of Electronics and communication engineering fundamentals to solve the complex Engineering problems |
| | | | | | | CO2 | Design prototypes and solutions to solve the specific needs related with public health, safety, society and environment leading to sustainable development following ethical values |
| | | | | | | CO3 | Adapt appropriate techniques, resources and modern engineering tools during the implementation of project |
| | | | | | | CO4 | Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and self-development |

**VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY**
**DEPARTMENT OF INFORMATION TECHNOLOGY**
**VR - 19 B.TECH. IT COURSE OUTCOMES**

| S. No. | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 1 | VR19 | 40 | M.Tech-Information Technology | 2040191100 | Discrete Mathematical Structures | CO1 | To understand the basic notions of discrete and continuous probability. |
| | | | | | | CO2 | To understand the methods of statistical inference, and the role that sampling distributions play in those methods. |
| | | | | | | CO3 | To be able to perform correct and meaningful statistical analyses of simple to moderate complexity. |
| | | | | | | CO4 | Illustrate properties and characteristics of various graphs and optimization techniques |
| 2 | VR19 | 40 | M.Tech-Information Technology | 2040191101 | Advanced Data Structures | CO1 | Understand the implementation of symbol table using hashing techniques. |
| | | | | | | CO2 | Develop and analyze algorithms for red-black trees, B-trees and Splay trees. |
| | | | | | | CO3 | Develop algorithms for text processing applications. |
| | | | | | | CO4 | Identify suitable data structures and develop algorithms for computational geometry problems. |
| 3 | VR19 | 40 | M.Tech-Information Technology | 2040191150 | Artificial Intelligence | CO1 | Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents. |
| | | | | | | CO2 | Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them. |
| | | | | | | CO3 | Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing. |
| | | | | | | CO4 | Solve problems with uncertain information using Bayesian approaches. |
| 4 | VR19 | 40 | M.Tech-Information Technology | 2040191151 | Service Oriented Architectures and Web Security | CO1 | Understand the basics of XML. |
| | | | | | | CO2 | Learn the concepts of SOA and Web services. |
| | | | | | | CO3 | find different approaches for providing security for XML documents as well as messages exchanged among Web Services. |
| | | | | | | CO4 | determine some of the prevailing standards and technologies of Web Services. |
| 5 | VR19 | 40 | M.Tech-Information Technology | 2040191152 | Internet of Things | CO1 | Summarize on the term 'internet of things' in different contexts. |
| | | | | | | CO2 | Design a PoC of an IoT system using Rasperry Pi/Arduino. |
| | | | | | | CO3 | Apply data analytics and use cloud offerings related to IoT. |
| | | | | | | CO4 | Analyze applications of IoT in real time scenario. |
| 6 | VR19 | 40 | M.Tech-Information Technology | 2040191153 | Optimization Techniques | CO1 | Students should able to apply the dynamic programming to solve problems of discreet and continuous variables. |
| | | | | | | CO2 | Students should able to apply the concept of non-linear programming. |
| | | | | | | CO3 | Students should able to carry out sensitivity analysis. |
| | | | | | | CO4 | Student should able to model the real world problem and simulate it. |
| 7 | VR19 | 40 | M.Tech-Information Technology | 2040191154 | Parallel Computer Architecture | CO1 | Students accustomed with the representation of data, addressing modes, and instructions sets. |
| | | | | | | CO2 | Students able to understand parallelism both in terms of a single processor and multiple processors. |
| | | | | | | CO3 | Technical knowhow of parallel hardware constructs to include instruction-level parallelism for multi core processor design. |
| | | | | | | CO4 | Use different performance metrics for analysis of parallel algorithms. |
| 8 | VR19 | 40 | M.Tech-Information Technology | 2040191155 | Big Data Analytics | CO1 | Understand the programming requirements viz., generic types and methods to perform data analysis. |
| | | | | | | CO2 | Formulate an effective strategy to implement a successful Data analytics project. |
| | | | | | | CO3 | To understand and analyze Map-Reduce programming model for better optimization. |
| | | | | | | CO4 | Identify the need based tools, viz., Pig and Hive and to handle. |
| 9 | VR19 | 40 | M.Tech-Information Technology | 2040191156 | Principles of Cryptography | CO1 | Building a new unbreakable cryptosystem. |
| | | | | | | CO2 | Blending the existing cryptographic algorithms with the existing communication protocols. |
| | | | | | | CO3 | Analyzing and application of cryptography for secure eCommerce and other secret transactions. |
| | | | | | | CO4 | Clasify various cryptographic protocols, hash functions, digital signature schemes. |
| 10 | VR19 | 40 | M.Tech-Information Technology | 2040191157 | Cluster and Grid Computing | CO1 | student will have knowledge of Grid Computing. |
| | | | | | | CO2 | student will have knowledge in web services and service-oriented architecture. |
| | | | | | | CO3 | student will have knowledge of Architecture for grid computing and Cluster Computing. |
| | | | | | | CO4 | student will have knowledge of process scheduling and load balancing. |

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| 11 | VR19 | 40 | M.Tech-Information Technology | 2040191158 | Imaging and Multimedia Systems | CO1 | Technical know to develop new compression standards. |
| | | | | | | CO2 | Acquire skill set to handle all multimedia components efficiently. |
| | | | | | | CO3 | Develop Integrated and Collaborative multimedia systems. |
| | | | | | | CO4 | Execute various algorithms require for image and multimedia systems. |
| 12 | VR19 | 40 | M.Tech-Information Technology | 2040191159 | Advanced Graph Theory | CO1 | Demonstrate basic concepts in graph theory: coloring, planar graphs. |
| | | | | | | CO2 | Evaluate precise and accurate mathematical definitions of objects in graph theory. |
| | | | | | | CO3 | Build some classical graph algorithms in order to find sub graphs with desirable properties. |
| | | | | | | CO4 | Compile and deduce properties of chromatic numbers and polynomials and identify certain problems as graph colouring problems |
| 13 | VR19 | 40 | M.Tech-Information Technology | 2000191100 | Research Methodology and IPR | CO1 | Understand the research problem, process and ethics. |
| | | | | | | CO2 | Prepare a well-structured research paper and scientific presentations |
| | | | | | | CO3 | Explore on various IPR components and process of filing. |
| | | | | | | CO4 | Understand the adequate knowledge on patent and rights |
| 14 | VR19 | 40 | M.Tech-Information Technology | 2040191110 | Advanced Data Structures Lab | CO1 | Implement List ADTs and their operations. |
| | | | | | | CO2 | Develop programs for implementing trees algorithms. |
| | | | | | | CO3 | Implement graph algorithms. |
| | | | | | | CO4 | Apply algorithm design techniques. |
| 15 | VR19 | 40 | M.Tech-Information Technology | 2040191111 | Computing Lab | CO1 | Implement real time problems using python. |
| | | | | | | CO2 | Develop programs for AI Techniques using Python. |
| | | | | | | CO3 | Implement big data problems using Hadoop. |
| | | | | | | CO4 | Apply algorithm design techniques on cryptography. |
| 16 | VR19 | 40 | M.Tech-Information Technology | 2000191130 | English for Research Paper Writing | CO1 | Understand that how to improve your writing skills . |
| | | | | | | CO2 | readability Learn about what to write in each section. |
| | | | | | | CO3 | Understand the skills needed when writing a Title Ensure the good quality of paper at very first- time submission. |
| | | | | | | CO4 | applying the knowledge in writing a technical paper and process of submission in qualititative journals. |
| 17 | VR19 | 40 | M.Tech-Information Technology | 2000191131 | Disaster Management | CO1 | Understanding foundations of hazards, disasters and associated natural/social phenomena. |
| | | | | | | CO2 | Familiarity with disaster management theory (cycle, phases). |
| | | | | | | CO3 | Methods of community involvement as an essential part of successful DRR and Analyze Risk Assessment and Strategies for Survival. |
| | | | | | | CO4 | Technological innovations in Disaster Risk Reduction: Advantages and problems. |
| 18 | VR19 | 40 | M.Tech-Information Technology | 2000191132 | Sanskrit for Technical Knowledge | CO1 | Understanding basic Sanskrit language. |
| | | | | | | CO2 | Ancient Sanskrit literature about science & technology can be understood. |
| | | | | | | CO3 | Being a logical language will help to develop logic in students. |
| | | | | | | CO4 | Learning Sanskrit Grammar, History of Sanskrit Literature,Drama. |
| 19 | VR19 | 40 | M.Tech-Information Technology | 2000191133 | Value Education | CO1 | Knowledge of self-development. |
| | | | | | | CO2 | Learn the importance of Human values. |
| | | | | | | CO3 | Developing the overall personality. |
| | | | | | | CO4 | Learn the importance of value education towards personal, national and global development. |
| 20 | VR19 | 40 | M.Tech-Information Technology | 2040191200 | Advanced Algorithms | CO1 | Introduce students to the advanced methods of designing and analyzing algorithms. |
| | | | | | | CO2 | The student should be able to choose appropriate algorithms and use it for a specific problem. |
| | | | | | | CO3 | To familiarize students with basic paradigms and data structures used to solve advanced algorithmic problems. |
| | | | | | | CO4 | To introduce the students to recent developments in the area of algorithmic design. |
| 21 | VR19 | 40 | M.Tech-Information Technology | 2040191201 | Full Stack Technologies | CO1 | Identify the Basic Concepts of Web & Markup Languages. |
| | | | | | | CO2 | Creating & Running Applications using JSP libraries. |
| | | | | | | CO3 | Creating Our First Controller Working with and Displaying in Angular Js and Nested Forms with ng-form. |
| | | | | | | CO4 | Working with the Files in React JS and Constructing Elements with Data. |
| 22 | VR19 | 40 | M.Tech-Information Technology | 2040191250 | Machine Learning | CO1 | Domain Knowledge for Productive use of Machine Learning and Diversity of Data. |
| | | | | | | CO2 | Demonstrate on Supervised and Computational Learning. |
| | | | | | | CO3 | Analyze on Statistics in learning techniques and Logistic Regression. |
| | | | | | | CO4 | Illustrate on Support Vector Machines and Perceptron Algorithm and Design a Multilayer Perceptron Networks and classification of decision tree. |

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| 23 | VR19 | 40 | M.Tech-Information Technology | 2040191251 | DevOps | CO1 | Understand the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility |
| | | | | | | CO2 | Describe DevOps & DevSecOps methodologies and their key concepts. |
| | | | | | | CO3 | Explain the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models. |
| | | | | | | CO4 | Set up complete private infrastructure using version control systems and CI/CD tools. |
| 24 | VR19 | 40 | M.Tech-Information Technology | 2040191252 | Advanced Network Principles and Protocols | CO1 | Familiarization of the different layers of TCP/IP protocol stack. |
| | | | | | | CO2 | Analyze the Concepts of Network media and topologies, Network security concepts and Network management. |
| | | | | | | CO3 | Understanding of the working principle of different protocols at different layers. |
| | | | | | | CO4 | Plan the interworking of distributed application basing on Semantic Web technology. |
| 25 | VR19 | 40 | M.Tech-Information Technology | 2040191253 | Distributed Computing | CO1 | Elucidate the foundations and issues of distributed systems. |
| | | | | | | CO2 | Describe the features of peer-to-peer and distributed shared memory systems and Understand the various synchronization issues and global state for distributed systems. |
| | | | | | | CO3 | Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems. |
| | | | | | | CO4 | Describe the agreement protocols and fault tolerance mechanisms in distributed systems. |
| 26 | VR19 | 40 | M.Tech-Information Technology | 2040191254 | Social Network Analytics | CO1 | Demonstrate social network analysis and measures and components of virtual communities. |
| | | | | | | CO2 | Analyze random graph models and navigate social networks data. |
| | | | | | | CO3 | Apply the network topology and Visualization tools. |
| | | | | | | CO4 | Analyze the experiment with small world models and clustering models. |
| 27 | VR19 | 40 | M.Tech-Information Technology | 2040191255 | Digital Image Processing | CO1 | Demonstrate the components of image processing and usage of various filteration techniques. |
| | | | | | | CO2 | Apply image compression techniques. |
| | | | | | | CO3 | Discuss the concepts of wavelet transforms. |
| | | | | | | CO4 | Analyze the concept of morphological image processing. |
| 28 | VR19 | 40 | M.Tech-Information Technology | 2040191256 | Block Chain Technologies | CO1 | Demonstrate the foundation of the Block chain technology and understand the processes in payment and funding. |
| | | | | | | CO2 | Identify the risks involved in building Block chain applications and how to earn profit from trading cryptocurrencies. |
| | | | | | | CO3 | Review of legal implications using smart contracts. |
| | | | | | | CO4 | Choose the present landscape of Blockchain implementations and Understand Crypto currency markets. |
| 29 | VR19 | 40 | M.Tech-Information Technology | 2040191257 | Data Science | CO1 | Explain how data is collected, managed and stored for data science. |
| | | | | | | CO2 | Understand the key concepts in data science, including their real-world applications. |
| | | | | | | CO3 | Implement data collection and management scripts using MongoDB. |
| | | | | | | CO4 | Evaluate toolkits used by various data scientist on real world applications |
| 30 | VR19 | 40 | M.Tech-Information Technology | 2040191258 | Soft Computing | CO1 | Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory. |
| | | | | | | CO2 | Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic. |
| | | | | | | CO3 | To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations. |
| | | | | | | CO4 | Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications. |
| 31 | VR19 | 40 | M.Tech-Information Technology | 2040191259 | Natural Language Processing | CO1 | Explain approaches to syntax and semantics in NLP. |
| | | | | | | CO2 | Demonstrate approaches to discourse, generation, dialogue and summarization within NLP. |
| | | | | | | CO3 | Identify machine learning techniques used in NLP, including hidden Markov models and probabilistic. |
| | | | | | | CO4 | Explain context-free grammars, clustering and unsupervised methods, log-linear and discriminative models, and the EM algorithm as applied within NLP. |
| 32 | VR19 | 40 | M.Tech-Information Technology | 2040191210 | Advance Algorithms Lab | CO1 | Identify classes, objects, members of a class and relationships among them needed for a specific problem. |
| | | | | | | CO2 | Examine algorithms performance using Prior analysis and asymptotic notations. |
| | | | | | | CO3 | Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked lists, graphs and trees. |
| | | | | | | CO4 | Apply and analyze functions of Dictionary. |

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| 33 | VR19 | 40 | M.Tech-Information Technology | 2040191211 | ull Stack Technologies La | CO1 | Develop web Applications using Scripting Languages & Frameworks. |
| | | | | | | CO2 | Creating & Running Applications using JSP libraries. |
| | | | | | | CO3 | Creating Our First Controller Working with and Displaying in Angular Js and Nested Forms with ng- form. |
| | | | | | | CO4 | Working with the Files in React JS and Constructing Elements with Data. |
| 34 | VR19 | 40 | M.Tech-Information Technology | 2040191270 | Mini Project with Seminar | CO1 | Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of computer science and engineering. |
| | | | | | | CO2 | Simulate and analyze the results reported in the chosen paper for seminar topic. |
| | | | | | | CO3 | Communicate effectively before the expert panel and develop technical reports. |
| | | | | | | CO4 | Respond to the queries raised by the evaluation committee and audience. |
| 35 | VR19 | 40 | M.Tech-Information Technology | 2000191230 | Constitution of India | CO1 | Discuss the growth of the demand for civil rights in India for the bulk of Indians |
| | | | | | | CO2 | Discuss the intellectual origins of the framework of argument that informed the |
| | | | | | | CO3 | Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. |
| | | | | | | CO4 | Discuss the passage of the Hindu Code Bill of 1956. |
| 36 | VR19 | 40 | M.Tech-Information Technology | 2000191231 | Pedagogy Studies | CO1 | What pedagogical practices are being used by teachers in formal and informal |
| | | | | | | CO2 | What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners? |
| | | | | | | CO3 | How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? |
| | | | | | | CO4 | Encourage Cooperative Learning Environment. |
| 37 | VR19 | 40 | M.Tech-Information Technology | 2000191232 | tress Management by Yog | CO1 | Develop healthy mind in a healthy body thus improving social health. |
| | | | | | | CO2 | Improve efficiency. |
| | | | | | | CO3 | Reduces Stress and Anxiety. |
| | | | | | | CO4 | Identify and apply injury prevention principles related to yoga activities. |
| 38 | VR19 | 40 | M.Tech-Information Technology | 2000191233 | Personality Development through Life Enlightenemnt Skills | CO1 | Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life. |
| | | | | | | CO2 | The person who has studied Geeta will lead the nation and mankind to peace and prosperity. |
| | | | | | | CO3 | Study of Neetishatakam will help in developing versatile personality of students. |
| | | | | | | CO4 | To re-engineer attitude and understand its influence on behavior. |
| 39 | VR19 | 40 | M.Tech-Information Technology | 2040192150 | Deep Learning | CO1 | Demonstrate the basic concepts fundamental learning techniques and layers. |
| | | | | | | CO2 | Discuss the Neural Network training, various random models. |
| | | | | | | CO3 | Explain different types of deep learning network models. |
| | | | | | | CO4 | Classify the Probabilistic Neural Networks and deep learning techniques. |
| 40 | VR19 | 40 | M.Tech-Information Technology | 2040192151 | Embedded Computing | CO1 | Knowledge and understanding of Embedded Linux OS Architecture, Linux Kernel Modules. |
| | | | | | | CO2 | Describes the differences between the general computing system and the embedded computing system. |
| | | | | | | CO3 | Write client server program using TCP sockets. |
| | | | | | | CO4 | Knowledge on IPv4 and IPV6 addresses. |
| 41 | VR19 | 40 | M.Tech-Information Technology | 2040192152 | Ethical Hacking | CO1 | Learn various hacking methods. |
| | | | | | | CO2 | Perform system security vulnerability testing. |
| | | | | | | CO3 | Perform system vulnerability exploit attacks. |
| | | | | | | CO4 | Produce a security assessment report and issues related to hacking. |
| 42 | VR19 | 40 | M.Tech-Information Technology | 2040192153 | Digital Marketing | CO1 | Explain about web pages with basic HTML5, DHTML tags using CSS and XML, the overview of W3C DOM. |
| | | | | | | CO2 | Demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs and discuss the key elements of a digital Java Scripts. |
| | | | | | | CO3 | Apply search engine optimization techniques to a website. |
| | | | | | | CO4 | Illustrate how the effectiveness of a digital marketing campaign can be measured. |

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| 43 | VR19 | 40 | M.Tech-Information Technology | 2040192160 | Python Programming | CO1 | Understand and comprehend the basics of python programming. |
| | | | | | | CO2 | Demonstrate the principles of structured programming and be able to describe, design, implement, and test structured programs using currently accepted methodology. |
| | | | | | | CO3 | Explain the use of the built-in data structures list, sets, tuples and dictionary and |
| | | | | | | CO4 | Identify real-world applications using oops, files and exception handling provided by python. |
| 44 | VR19 | 40 | M.Tech-Information Technology | 2040192161 | Web Technologies | CO1 | Understand the concepts of Java Script and develop a dynamic webpage by the use of Java Script. |
| | | | | | | CO2 | Write a well formed / valid XML document and describe the concepts of Ajax. |
| | | | | | | CO3 | Creating & Running PHP script and also to connect & working with DBMS such as MySql. |
| | | | | | | CO4 | Understand the concepts PERL & RUBY and develop the web applications by using PERL & RUBY. |
| 45 | VR19 | 40 | M.Tech-Information Technology | 2040192162 | Artificial Intelligence | CO1 | Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents. |
| | | | | | | CO2 | Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them. |
| | | | | | | CO3 | Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing. |
| | | | | | | CO4 | Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning. |
| 46 | VR19 | 40 | M.Tech-Information Technology | 2040192163 | Internet of Things | CO1 | Summarize on the term 'internet of things' in different contexts. |
| | | | | | | CO2 | Analyze various protocols for IoT. |
| | | | | | | CO3 | Design a PoC of an IoT system using Rasperry Pi/Arduino and Apply data analytics and use cloud offerings related to IoT. |
| | | | | | | CO4 | Analyze applications of IoT in real time scenario. |
| 47 | VR19 | 40 | M.Tech-Information Technology | 2040192164 | Machine Learning | CO1 | Domain Knowledge for Productive use of Machine Learning and Diversity of Data. |
| | | | | | | CO2 | Demonstrate on Supervised and Computational Learning and Analyze on Statistics in learning techniques and Logistic Regression . |
| | | | | | | CO3 | Illustrate on Support Vector Machines and Perceptron Algorithm. |
| | | | | | | CO4 | Design a Multilayer Perceptron Networks and classification of decision tree. |
| 48 | VR19 | 40 | M.Tech-Information Technology | 2040192165 | Advanced Data Structures | CO1 | Understand the implementation of symbol table using hashing techniques. |
| | | | | | | CO2 | Develop and analyze algorithms for red-black trees, B-trees and Splay trees. |
| | | | | | | CO3 | Develop algorithms for text processing applications. |
| | | | | | | CO4 | Identify suitable data structures and develop algorithms for computational geometry problems. |
| 49 | VR19 | 40 | M.Tech-Information Technology | 2040192170 | Dissertation-I/Industrial Project | CO1 | Apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint. |
| | | | | | | CO2 | Perform individually as well as in a team, accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success. |
| | | | | | | CO3 | Use formal and informal communications with team members and guide, make presentations and prepare technical document. |
| | | | | | | CO4 | Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems. |
| 50 | VR19 | 40 | M.Tech-Information Technology | 2040192270 | Dissertation-II | CO1 | Apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint. |
| | | | | | | CO2 | Perform individually as well as in a team, accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success. |
| | | | | | | CO3 | Use formal and informal communications with team members and guide, make presentations and prepare technical document. |
| | | | | | | CO4 | Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems. |

**VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)**
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**
**VR19 M. Tech. Power and Industrial Drives Course Outcomes**

| S. No. | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|
| 1 | 42 | M.Tech-Power and Industrial Drives | 2042191100 | Electrical Machine Modeling and Analysis | CO1 | Understand the behavior of DC motors and also model the different Dc motors. |
| | | | | | CO2 | Apply the knowledge of reference frame theory for AC machines to model the induction and Synchronous machine |
| | | | | | CO3 | Evaluate the steady state and transient behaviour of induction and synchronous machines to Propose the suitability of drives for different industrial application |
| | | | | | CO4 | Analyze the characteristics of different types of DC motors and 2-Phase induction machines using voltage and torque equations to differentiate the behaviour and to propose their applications in real world |
| 2 | 42 | M.Tech-Power and Industrial Drives | 2042191101 | Analysis of Power Electronic Converters | CO1 | Examine the operation of phase controlled converters and AC voltage converters |
| | | | | | CO2 | Determine the requirements of power factor correction in converter circuits |
| | | | | | CO3 | Analyze the operation of 3-phase inverters with and without PWM techniques |
| | | | | | CO4 | Describe principles of operation and features of multilevel inverters. |
| 3 | 42 | M.Tech-Power and Industrial Drives | 2042191110 | Power Electronics Simulation Laboratory | CO1 | Examine power semiconductor device properties via simulation |
| | | | | | CO2 | Analyze and implementing the speed controlling techniques for AC machines in simulation |
| | | | | | CO3 | Explain the operation of various power electronic converters in simulation. |
| | | | | | CO4 | Implement the PWM techniques in simulation |
| 4 | 42 | M.Tech-Power and Industrial Drives | 2042191111 | Power Converters Laboratory | CO1 | Experimentally understand the different converters |
| | | | | | CO2 | Experimentally understand the dual converter application |
| | | | | | CO3 | experimentally understand inverters for single and three phase loads |
| | | | | | CO4 | Design of gate drive circuits for IGBT & MOSFET"s. |
| 5 | 42 | M.Tech-Power and Industrial Drives | 2042191150 | Modern Control Theory | CO1 | Understand the state variable approach's which are suitable for higher order systems |
| | | | | | CO2 | Analyze the concepts of controllability and observability. |
| | | | | | CO3 | Examine the stability and instability problems in continuous time invariant systems, various non-linearities using phase plane analysis and descriptive functions an |
| | | | | | CO4 | Solve the optimal control problems for any continuous time invariant system |
| 6 | 42 | M.Tech-Power and Industrial Drives | 2042191151 | Power Quality and Custom Power Devices | CO1 | Identify the issues related to power quality in power systems and also address the problems of transient and long duration voltage variations in power systems. |
| | | | | | CO2 | Analyze the effects of harmonics and study of different mitigation techniques. |
| | | | | | CO3 | Understand the importance of custom power devices and their applications. |
| | | | | | CO4 | Acquire knowledge on different compensation techniques to minimize power quality disturbances |
| 7 | 42 | M.Tech-Power and Industrial Drives | 2042191152 | Programmable Logic Controllers & Applications | CO1 | Understand the PLCs and their I/O modules. |
| | | | | | CO2 | Develop control algorithms to PLC using ladder logic etc. |
| | | | | | CO3 | Manage PLC registers for effective utilization in different applications and also□ □ andle data functions & control of two axis, their axis robots with PLC. |
| | | | | | CO4 | Design PID controller with PLC |
| 8 | 42 | M.Tech-Power and Industrial Drives | 2042191153 | Artificial Intelligence Techniques | CO1 | Understand the concept of genetic algorithm and its application in optimization. |
| | | | | | CO2 | Differentiate between Algorithmic based methods and knowledge based methods |
| | | | | | CO3 | Use appropriate AI framework for solving of power system problems. |
| | | | | | CO4 | Design the fuzzy logic controllers for power engineering applications. |
| 9 | 42 | M.Tech-Power and Industrial Drives | 2042191154 | Renewable Energy Technologies | CO1 | Understand various general aspects of renewable energy systems |
| | | | | | CO2 | Analyze and design induction generator for power generation from wind |
| | | | | | CO3 | Design MPPT controller for solar power utilization |
| | | | | | CO4 | Utilize fuel cell systems for power generation. |
| 10 | 42 | M.Tech-Power and Industrial Drives | 2042191155 | HVDC Transmission and Flexible AC Transmission Systems | CO1 | Evaluate the HVDC converter configurations and assess the performance metrics. |
| | | | | | CO2 | Understand controllers for controlling the power flow through a dc link and compute filter Parameters |
| | | | | | CO3 | Apply impedance, phase angle and voltage control for real and reactive power flow in ac transmission systems with FACTS controller. |
| | | | | | CO4 | Analyze and select a suitable FACTS controller for a given power flow condition. |

| S. No. | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|
| 11 | 42 | M.Tech-Power and Industrial Drives | 2042191200 | Switched Mode Power Conversion | CO1 | Analyze operation and control of non-isolated and isolated switch mode converters. |
| | | | | | CO2 | Design of non-isolated and isolated switch mode converters |
| | | | | | CO3 | Understand the operation and control of resonant converters |
| | | | | | CO4 | Create the switch mode converters based on linearized models |
| 12 | 42 | M.Tech-Power and Industrial Drives | 2042191201 | Power Electronic Control of Electrical Drives | CO1 | Understand the concepts of scalar and vector control methods for drive systems. |
| | | | | | CO2 | Design controllers and converters for induction motor, PMSM and BLDC drives. |
| | | | | | CO3 | Select and implement proper control techniques for induction motor and PMSM for specific applications |
| | | | | | CO4 | Analyze the control techniques and converters for SRM drives. |
| 13 | 42 | M.Tech-Power and Industrial Drives | 2042191210 | Electric Drives Simulation Laboratory | CO1 | Simulation of Buck converter, Boost converter, single–phase square wave inverter and PWM inverter. |
| | | | | | CO2 | Design controllers and converters for induction motor, PMSM and BLDC drives |
| | | | | | CO3 | Simulate D.C separately excited motor and transmission line by incorporating line, load and transformer models. |
| | | | | | CO4 | Simulation of single phase AC voltage regulator with different loads. |
| 14 | 42 | M.Tech-Power and Industrial Drives | 2042191211 | Electric Drives Laboratory | CO1 | Explain about characteristics of various power semiconductor devices and firing circuits. |
| | | | | | CO2 | Analyze the performance of single–phase and three–phase full–wave bridge converters with both resistive, inductive and motor loads. |
| | | | | | CO3 | Illustrate the working of Buck converter, Boost converter, single–phase square wave inverter and PWM inverter. |
| | | | | | CO4 | Describe the operation of single phase AC voltage regulator with different loads. |
| 15 | 42 | M.Tech-Power and Industrial Drives | 2042191250 | Control & Integration of Renewable Energy Systems | CO1 | Gain knowledge on different renewable energy sources and storage devices |
| | | | | | CO2 | Recognize, model and simulate different renewable energy sources |
| | | | | | CO3 | Analyze, model and simulate basic control strategies required for grid connection |
| | | | | | CO4 | Implement a complete system for standalone/grid connected system |
| 16 | 42 | M.Tech-Power and Industrial Drives | 2042191251 | Hybrid Electric Vehicles | CO1 | Analyze the concept of electric vehicles and hybrid electric vehicles |
| | | | | | CO2 | Discover the different motors used for hybrid electric vehicles |
| | | | | | CO3 | Understand the power converters used in hybrid electric vehicles |
| | | | | | CO4 | Know the different batteries and other energy storage systems. |
| 17 | 42 | M.Tech-Power and Industrial Drives | 2042191252 | Digital ControlSystems | CO1 | Analyze digital control systems using Z-transforms and Inverse Z-Transforms |
| | | | | | CO2 | Evaluate the state transition matrix and solve state equation for discrete model for continuous time systems, investigate the controllability and observability. |
| | | | | | CO3 | Determine the stability; design state feedback controller. |
| | | | | | CO4 | Solve a given optimal control problem |
| 18 | 42 | M.Tech-Power and Industrial Drives | 2042191253 | Advanced Digital Signal Processing | CO1 | Design digital filters with different techniques and also describe structure of digital filter |
| | | | | | CO2 | Understand the implementation aspects of signal processing algorithms. |
| | | | | | CO3 | Know the effect of finite word length in signal processing. |
| | | | | | CO4 | Analyze different power spectrum estimation techniques |
| 19 | 42 | M.Tech-Power and Industrial Drives | 2042191254 | Applications of PowerConverters | CO1 | Analyze power electronic application requirements |
| | | | | | CO2 | Identify suitable power converter from the available configurations |
| | | | | | CO3 | Develop improved power converters for any stringent application requirements. |
| | | | | | CO4 | Improvise the existing control techniques to suit the application. Design of Bi-directional converters for charge/discharge applications |
| 20 | 42 | M.Tech-Power and Industrial Drives | 2042191255 | Microcontrollers | CO1 | Understand about DSP architecture and assembly programming for DSP processors. |
| | | | | | CO2 | Design the interfacing circuits for input and output to PIC micro controllers and DSP processors |
| | | | | | CO3 | Create ALP for DSP processing devices |
| | | | | | CO4 | Design PWM controller for power electronic circuits using FPGA |
| 21 | 42 | M.Tech-Power and Industrial Drives | 2042191270 | Mini Project with Seminar | CO1 | Carryout literature survey, and choose a relevant topic reported in recent IEEE/IET/Elsevier/ Springer/Taylor and Francis/conference publications / transactions in the domain of Electrical and Electronics Engineering. |
| | | | | | CO2 | Simulate and analyze the results reported in the chosen paper for seminar topic. |
| | | | | | CO3 | Communicate effectively before the expert panel and develop technical reports. |
| | | | | | CO4 | Respond to the queries raised by the evaluation committee and audience |

| S. No. | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|
| 22 | 42 | M.Tech-Power and Industrial Drives | 2042192150 | Digital Signal Processing Controlled Drives | CO1 | Interface the DSP platform with sensors such as hall-effect voltage sensors, |
| | | | | | CO2 | Understand the hall-effect current sensors, shaft encoder for data acquisition for motor drive applications and also use algorithms for the realization of controllers, Pulse Width Modulators and observers. |
| | | | | | CO3 | Scale and normalize the data to suit the requirements of the drive system |
| | | | | | CO4 | Exploit the architectural features of the DSP platform to design and implement |
| 23 | 42 | M.Tech-Power and Industrial Drives | 2042192151 | Smart Grid Technologies | CO1 | Explain about the micro grids and distributed generation systems. |
| | | | | | CO2 | Develop concepts of smart grid technologies in hybrid electrical vehicles etc. |
| | | | | | CO3 | Understand smart substations, feeder automation, GIS, smart grids, smart grid policies and developments in smart grids |
| | | | | | CO4 | Analyze the effect of power quality in smart grid and to understand latest developments in ICT for smart grid. |
| 24 | 42 | M.Tech-Power and Industrial Drives | 2042192152 | Modeling & Simulation of PowerElectronic Systems | CO1 | Understand the back ground activities i.e. numerical solution used in the simulation software |
| | | | | | CO2 | Choose the required numerical solver to be used for analysis |
| | | | | | CO3 | Debug the convergence problems occurring during simulation |
| | | | | | CO4 | Investigate different switching function technique and their properties of the switching function |
| 25 | 42 | M.Tech-Power and Industrial Drives | 2042192160 | MOOCs | CO1 | Analyze operation and control of differernt switch mode converters. |
| | | | | | CO2 | Design of switch mode converters |
| | | | | | CO3 | Understand the operation and control of resonant converters |
| | | | | | CO4 | Create the switch mode converters based on linearized models |
| 26 | 42 | M.Tech-Power and Industrial Drives | 2042192161 | Renewable Energy Systems | CO1 | Gain knowledge on different renewable energy sources and storage devices |
| | | | | | CO2 | Recognize, model and simulate different renewable energy sources |
| | | | | | CO3 | Analyze, model and simulate basic control strategies required for grid connection |
| | | | | | CO4 | Implement a complete system for standalone/grid connected system |
| 27 | 42 | M.Tech-Power and Industrial Drives | 2042192162 | Optimization Techniques | CO1 | Define an objective function and constraint functions in terms of design variables, and then state the optimization problem |
| | | | | | CO2 | Solve single variable and multi variable optimization problems, without and with constraints. |
| | | | | | CO3 | Apply linear and non-linear programming technique to an optimization problem. |
| | | | | | CO4 | Explain basic principles of Genetic Algorithms and Particle Swarm Optimization methods |
| 28 | 42 | M.Tech-Power and Industrial Drives | 2042192163 | Programmable Logic Controller | CO1 | Understand the PLCs and their I/Omodules. |
| | | | | | CO2 | Develop control algorithms to PLC using ladderlogic. |
| | | | | | CO3 | Manage PLC registers for effective utilization in different applications. |
| | | | | | CO4 | Design Hardware configuration and develop logic for different Industrial Applications. |
| 29 | 42 | M.Tech-Power and Industrial Drives | 2042192170 | Dissertation-I/ Industrial Project # | CO1 | Apply knowledge of Electrical and Electronics engineering fundamentals to solve the complex Engineering problems |
| | | | | | CO2 | Design prototypes and solutions to solve the specific needs related with public health, safety, society and environment leading to sustainable development following ethical values |
| | | | | | CO3 | Adapt appropriate techniques, resources and modern engineering tools during the implementation of project |
| | | | | | CO4 | Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and self-development |
| 30 | 42 | M.Tech-Power and Industrial Drives | 2042192270 | Dissertation-II | CO1 | Apply knowledge of Electrical and Electronics engineering fundamentals to solve the complex Engineering problems |
| | | | | | CO2 | Design prototypes and solutions to solve the specific needs related with public health, safety, society and environment leading to sustainable development following ethical values |
| | | | | | CO3 | Adapt appropriate techniques, resources and modern engineering tools during the implementation of project |
| | | | | | CO4 | Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and self-development |

**VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)**
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**
**VR19 - M.Tech - Computer Science and Engineering Course Outcomes**

| S. No. | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 1 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191100 | Mathematical Foundations of Computer Science | CO1 | To apply the basic rules and theorems of probability theory such as Baye's Theorem, to determine probabilities that help to solve engineering problems and to determine the expectation and variance of a random variable from its distribution. |
| | | | | | | CO2 | Able to perform and analyze of sampling, means, proportions, variances and estimates the maximum likelihood based on population parameters. |
| | | | | | | CO3 | To learn how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions based on the results of statistical tests. |
| | | | | | | CO4 | Apply graph theory for real time problems like network routing problem. |
| 2 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191101 | Advanced Data Structures & Algorithms | CO1 | Ability to write and analyze algorithms for algorithm correctness and efficiency. |
| | | | | | | CO2 | Master a variety of advanced abstract data type (ADT) and data structures and their Implementation. |
| | | | | | | CO3 | Demonstrate various searching, sorting and hash techniques and be able to apply and solve problems of real life. |
| | | | | | | CO4 | Design and implement variety of data structures including linked lists, binary trees, heaps, graphs and search trees. |
| 3 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191110 | Advanced Data Structures & Algorithms Lab | CO1 | Identify classes, objects, members of a class and relationships among them needed for a specific problem. |
| | | | | | | CO2 | Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked lists, graphs and trees.). |
| | | | | | | CO3 | Apply and analyze functions of Dictionary. |
| | | | | | | CO4 | Implement Programs on Hashing. |
| 4 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191111 | Advanced Computing Lab | CO1 | The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to the Pi. |
| | | | | | | CO2 | Development and use of s IoT technology in Societal and Industrial Applications. |
| | | | | | | CO3 | Skills to undertake high quality academic and industrial research in Sensors and IoT. |
| | | | | | | CO4 | To classify Real World IoT Design Constraints, Industrial Automation in IoT. |
| 5 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191150 | Artificial Intelligence | CO1 | Identify Methods in AI that may be suited to solving a given problem and Game Playing. |
| | | | | | | CO2 | Analyze the basic issues of different types of knowledge representation techniques to build intelligent system. |
| | | | | | | CO3 | Build Expert systems for real time applications. |
| | | | | | | CO4 | Determination of uncertainty of data using different probability approaches for real time applications. |
| 6 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191151 | Digital ImageProcessing | CO1 | Demonstrate the components of image processing. |
| | | | | | | CO2 | Explain various filtration techniques. |
| | | | | | | CO3 | Apply image compression techniques. |
| | | | | | | CO4 | Discuss the concepts of wavelet transforms. |
| 7 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191152 | Advanced OperatingSystems | CO1 | Illustrate on the fundamental concepts of distributed operating systems, its architecture and distributed mutual exclusion. |
| | | | | | | CO2 | Analyze on deadlock detection algorithms and agreement protocols. |
| | | | | | | CO3 | Make use of algorithms for implementing DSM and its scheduling for protection and security in distributed operating systems. |
| | | | | | | CO4 | Elaborate on concurrency control mechanisms in distributed database systems. |

| S. No. | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 8 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191153 | Advanced ComputerNetworks | CO1 | Illustrate reference models with layers, protocols and interfaces. |
| | | | | | | CO2 | Describe the routing algorithms, Sub netting and Addressing of IP V4and IPV6. |
| | | | | | | CO3 | Describe and Analysis of basic protocols of computer networks, and how they can be used to assist in network design and implementation. |
| | | | | | | CO4 | Describe the concepts Wireless LANS, WIMAX, IEEE 802.11, Cellular telephony and Satellite networks. |
| 9 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191154 | Internet of Things | CO1 | Summarize on the term 'internet of things' in different contexts. |
| | | | | | | CO2 | Design a PoC of an IoT system using Rasperry Pi/Arduino. |
| | | | | | | CO3 | Apply data analytics and use cloud offerings related to IoT. |
| | | | | | | CO4 | Analyze applications of IoT in real time scenario. |
| 10 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191155 | Object Oriented SoftwareEngineering | CO1 | Apply the Object Oriented Software-Development Process to design software. |
| | | | | | | CO2 | Analyze and Specify software requirements through a SRS documents. |
| | | | | | | CO3 | Design and Plan software solutions to problems using an object-oriented strategy. |
| | | | | | | CO4 | Model the object oriented software systems using Unified Modeling Language (UML). |
| 11 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2000191100 | Research Methodology and IPR | CO1 | Discuss the process used for research Problem selection and Research Paper Writing. |
| | | | | | | CO2 | Interpret the Patent writing and Development. |
| | | | | | | CO3 | Describe the Procedure for Grant of Patents. |
| | | | | | | CO4 | Illustrate new Developments in IPR. |
| 12 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2000191130 | Soft skills (Audit course) | CO1 | Teamwork – learning to connect and work with others to achieve a set task. |
| | | | | | | CO2 | Leadership – assessing the requirements of a task, identifying the strengths within the team, utilizing the diverse skills of the group to achieve the set objective, awareness of risk/safety. |
| 13 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2000191130 | Disaster Management (Audit course) | CO1 | learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response. |
| | | | | | | CO2 | critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. |
| | | | | | | CO3 | develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. |
| | | | | | | CO4 | critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries. |
| 14 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2000191130 | Pedagogy Studies (Audit course) | CO1 | What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries? |
| | | | | | | CO2 | What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners? |
| | | | | | | CO3 | How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? |
| 15 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2000191130 | Stress Management By Yoga (Audit course) | CO1 | Develop healthy mind in a healthy body thus improving social health also. |
| | | | | | | CO2 | Improve efficiency. |
| 16 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191200 | Machine learning | CO1 | Domain Knowledge for Productive use of Machine Learning and Diversity of Data. Demonstrate on Supervised and Computational Learning. |
| | | | | | | CO2 | Analyze on Statistics in learning techniques and Logistic Regression Illustrate on Support Vector Machines and Perceptron Algorithm. |
| | | | | | | CO3 | Design a Multilayer Perceptron Networks and classification of decision tree. |
| | | | | | | CO4 | Demonstrate how to apply a variety of learning algorithms to data. |
| 17 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191201 | Big DataAnalytics | CO1 | Illustrate on big data and its use cases from selected businessdomains. |
| | | | | | | CO2 | Interpret and summarize on No SQL,Cassandra. |
| | | | | | | CO3 | Analyze the HADOOP and Map Reduce technologies associated with big data analytics and explore on Big Data applications UsingHive. |
| | | | | | | CO4 | Make use of Apache Spark, RDDs etc. to work withdatasets. |

| S. No. | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 18 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191210 | Machine Learning with python lab | CO1 | Implement procedures for the machine learning algorithms. |
| | | | | | | CO2 | Design Python programs for various Learning algorithms. |
| | | | | | | CO3 | Apply appropriate data sets to the Machine Learning algorithms. |
| | | | | | | CO4 | Identify and apply Machine Learning algorithms to solve real world problems. |
| 19 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191211 | Big Data Lab | CO1 | Illustrate on Bigdata and its usecases from selected business domains. |
| | | | | | | CO2 | Analyse the Hadoop with Java and Map reduce techniques associated with big data. |
| | | | | | | CO3 | analyze and explore on big data applications using HIVE. |
| | | | | | | CO4 | Access real time processing with Hadoop. |
| 20 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191250 | Advanced Databases and Mining | CO1 | Analyze on normalization techniques. |
| | | | | | | CO2 | Elaborate on concurrency control techniques and query optimization. |
| | | | | | | CO3 | Summarize the concepts of data mining, data warehousing and data preprocessing strategies. |
| | | | | | | CO4 | Apply data mining algorithms. |
| 21 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191251 | Ad Hoc & Sensor Networks | CO1 | Explain the Fundamental Concepts and applications of ad hoc and wireless sensor networks. |
| | | | | | | CO2 | Discuss the MAC protocol issues of ad hocnetworks. |
| | | | | | | CO3 | Enumerate the concept of routing protocols for ad hoc wireless networks with respect to TCP design issues. |
| | | | | | | CO4 | Analyze & Specify the concepts of network architecture and MAC layer protocol for WSN. |
| 22 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191252 | SoftComputing | CO1 | Elaborate fuzzy logic and reasoning to handle uncertainty in engineeringproblems. |
| | | | | | | CO2 | Make use of genetic algorithms to combinatorial optimizationproblems. |
| | | | | | | CO3 | Distinguish artificial intelligence techniques, including search heuristics, knowledge representation, planning andreasoning. |
| | | | | | | CO4 | Formulate and apply the principles of self-adopting and self organizing neuro fuzzy inference systems. |
| 23 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191253 | CloudComputing | CO1 | Interpret the key dimensions of the challenge of CloudComputing. |
| | | | | | | CO2 | Examine the economics, financial, and technological implications for selecting cloud computing for ownorganization. |
| | | | | | | CO3 | Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-basedapplications. |
| | | | | | | CO4 | Evaluate own organizations' needs for capacity building and training in cloud computing-related IT areas. |
| 24 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191254 | Principles of Computer Security | CO1 | Describe the key security requirements of confidentiality, integrity, and availability, types of security threats and attacks and summarize the functional requirements for computersecurity. |
| | | | | | | CO2 | Explain the basic operation of symmetric block encryption algorithms, use of secure hash functions for message authentication, digital signaturemechanism. |
| | | | | | | CO3 | Discuss the issues involved and the approaches for user authentication and explain how access control fits into the broader context that includes authentication, authorization, andaudit. |
| | | | | | | CO4 | Explain the basic concept of a denial-of-service attack, nature of flooding attacks, distributed denial- of-service attacks and describe how computer security vulnerabilities are a result of poor programmingpractices. |
| 25 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191255 | High Performance Computing | CO1 | Design, formulate, solve and implement high performance versions of standard single threaded algorithms. |
| | | | | | | CO2 | Demonstrate the architectural features in the GPU and MIC hardware accelerators. |
| | | | | | | CO3 | Design programs to extract maximum performance in a multicore, shared memory execution environment processor. |
| | | | | | | CO4 | Develop and deploy large scale parallel programs on tightly coupled parallel systems using the message passing paradigm. |
| 26 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058191270 | Mini Project with Seminar | CO1 | Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of computer science and engineering. |
| | | | | | | CO2 | Simulate and analyze the results reported in the chosen paper for seminar topic. |
| | | | | | | CO3 | Communicate effectively before the expert panel and develop technical reports. |
| | | | | | | CO4 | Respond to the queries raised by the evaluation committee and audience. |

| S. No. | Regulation | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 27 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2025191270 | Constitution of India (Audit Course) | CO1 | Have general knowledge and legal literacy and thereby to take up competitive examinations. |
| | | | | | | CO2 | Understand state and central policies, fundamental uties. |
| | | | | | | CO3 | Understand Electoral Process, special provisions. |
| | | | | | | CO4 | Understand powers and functions of Municipalities, Panchayats and Cooperative Societies. |
| 28 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2025191270 | Sanskrit For Technical Knowledge (Audit Course) | CO1 | Understanding basic Sanskrit language. |
| | | | | | | CO2 | Ancient Sanskrit literature about science & technology can be understood Being a logical language will help to develop logic in. |
| 29 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2025191270 | Value Education (Audit Course) | CO1 | Knowledge of self-development. |
| | | | | | | CO2 | Learn the importance of Human values 3.Developing the overall personality. |
| 30 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2025191270 | Personality Development Through Life Enlightenment Skills (Audit | CO1 | Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life. |
| | | | | | | CO2 | The person who has studied Geeta will lead the nation and mankind to peace and prosperity Study of Neetishatakam will help in developing versatile personality of students. |
| 31 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058192150 | Deep Learning | CO1 | Demonstrate the basic concepts fundamental learning techniques and layers. |
| | | | | | | CO2 | Discuss the Neural Network training, various random models. |
| | | | | | | CO3 | Explain different types of deep learning network models. |
| | | | | | | CO4 | Classify the Probabilistic Neural Networks. |
| 32 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058192151 | Social Network Analysis | CO1 | Demonstrate social network analysis and measures. |
| | | | | | | CO2 | Analyze random graph models and navigate social networks data. |
| | | | | | | CO3 | Apply the network topology and Visualization tools. |
| | | | | | | CO4 | Analyze the experiment with small world models and clustering models. |
| 33 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058192152 | MOOCs-1 | CO1 | Connect openly on a global scale, with global learners and instructors. |
| | | | | | | CO2 | Develop high quality learning using multimedia platform. |
| | | | | | | CO3 | Self assessment of their performance and learning process. |
| | | | | | | CO4 | Develop a life long learning culture and updating the knowledge according with emerging trends. |
| 34 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058192160 | MOOCs-2 | CO1 | Connect openly on a global scale, with global learners and instructors. |
| | | | | | | CO2 | Develop high quality learning using multimedia platform. |
| | | | | | | CO3 | Self assessment of their performance and learning process. |
| | | | | | | CO4 | Develop a life long learning culture and updating the knowledge according with emerging trends. |
| 35 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058192170 | Dissertation-I/ Industrial Project # | CO1 | apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint. |
| | | | | | | CO2 | Ability to perform individually accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success. |
| | | | | | | CO3 | Ability to use formal and informal communications with guide, make presentations and prepare technical document. |
| | | | | | | CO4 | Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems. |
| 36 | VR19 | 58 | M.Tech-Computer Science and Engineering | 2058192270 | Dissertation-II | CO1 | apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint. |
| | | | | | | CO2 | Ability to perform individually accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success. |
| | | | | | | CO3 | Ability to use formal and informal communications with guide, make presentations and prepare technical document. |
| | | | | | | CO4 | Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems. |

## VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)

## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### VR19 -M. Tech. Electronics and Communication Engineering Course Outcomes

| S.NO | Regulation | Programme Code | Programme Name | Course Code | Course Name | COs | Course Outcomes (COs):Upon completion of the course student will be able to |
|---|---|---|---|---|---|---|---|
| 1 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191100 | Digital System Design | CO1 | Understand the basic concepts of a Karnaugh Map ("K-map") for a 2-, 3-, 4-, or 5-variable logic function and to identify the prime implicates, essential prime implicates, and nonessential prime implicates of a function depicted on a K-map.Perform the minimization of a Boolean function using tabular method, QM algorithm and CAMP algorithm and determine the Adjacencies, DA, CSC, SSMs, EPCs and SPCs. |
| | | | | | | CO2 | Perform the minimization of PLA using IISc algorithm and folding using COMPACT algorithm. |
| | | | | | | CO3 | Design a digital circuit by steps involving ASM chart and understand the digital system design approaches using CPLDs, FPGAs and ASICs. |
| | | | | | | CO4 | Rectify a single fault and multiple faults in combinational circuits using Path sensitization method, Boolean difference method and Kohavi algorithm and also perform fault diagnosis in sequential circuits. |
| 2 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191101 | Digital Data Communication | CO1 | Model digital communication system using appropriate mathematical techniques (error probability, constellation diagrams, pharos diagrams). |
| | | | | | | CO2 | Understanding the basic concepts of how digital data is transferred across computer networks. Independently understand basic computer network technology. |
| | | | | | | CO3 | Understand and explain Data Communications System and its components and identification of the different types of network topologies and protocols. |
| | | | | | | CO4 | Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer. Identify the different types of network devices and their functions within a network and finally network design and implementation. |
| 3 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191150 | Transform Techniques | CO1 | learn basics of two-dimensional transforms. |
| | | | | | | CO2 | Understand the definition, properties and applications of various two-dimensional transform. |
| | | | | | | CO3 | Understandthebasicconceptsofwaveletransform. |
| | | | | | | CO4 | Understandthespecialtopicssuchaswaveletpackets,Bi-orthogonalwaveletse.t.c. |
| 4 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191151 | VLSI Technology and Design | CO1 | ReviewofFET fundamentalsforVLSIdesign. |
| | | | | | | CO2 | Toacquiresknowledgeaboutstickdiagramsandlayouts. |
| | | | | | | CO3 | EnabletodesignthesubsystemsbasedonVLSIconcepts |
| | | | | | | CO4 | Analyse the floor planning methods |
| 5 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191152 | Radar Signal Processing | CO1 | UnderstandtheoperationofRadarandcharacteristicsofMatchedfilter fornon-whitenoise. |
| | | | | | | CO2 | Knowthesignificanceandtypes ofpulsecompression techniquesforanalogand digitalsignals and phasecodinginRadarandvariouspolyphasecodesusedforphasecoding. |
| 6 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191153 | Statistical Signal Processing | CO1 | Generalize the properties of statistical models in the analysis of signals using Stochastic processes. |
| | | | | | | CO2 | Differentiate the prominence of various spectral estimation techniques for Achieving higher resolution in the estimation of power spectral density. |
| | | | | | | CO3 | Outline various parametric estimation methods to accomplish the signal modeling even at higher order statistics. |
| | | | | | | CO4 | Design and development of optimum filters using classical and adaptive algorithms. |
| 7 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191154 | Optical Communication Technology | CO1 | Abletoanalyzecharacteristicsofopticalfiber andsignalpropagationthroughopticalfibers |
| | | | | | | CO2 | Know the commonly used components and subsystems in optical communication and network systems ,Working principle of optical communication components ,amplifiers, filters |
| | | | | | | CO3 | Analyze Transmission system model |
| | | | | | | CO4 | Understand the importance of wavelength division multiplexing (WDM) and de-multiplexing, |
| 8 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191155 | Network Security & Cryptography | CO1 | Identify and utilize different forms of cryptography techniques. |
| | | | | | | CO2 | Incorporate authentication and security in the network applications. |
| | | | | | | CO3 | Distinguish among different types of threats to the system and handle the same. |
| | | | | | | CO4 | Analyze and design hash and MAC algorithms, and digital signatures. |
| 9 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191110 | System Design Using VHDL Lab | CO1 | Identify, formulate, solve and implement problems in signal processing, communication systemsetc using RTL design tools. |
| | | | | | | CO2 | Use EDA tools like Cadence, Mentor Graphics and Xilinx. |
| | | | | | | CO3 | Design different digital circuits and simulate using Xilinx |
| | | | | | | CO4 | Apply verilog programming tools to implement different applications. |
| 10 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191111 | Data Communications Lab | CO1 | Understand the basics of data communication, networking, internet and their importance. |
| | | | | | | CO2 | Analyze the services and features of various protocol layers in data networks. |
| | | | | | | CO3 | Differentiate wired and wireless computer networks |
| | | | | | | CO4 | Analyse TCP/IP and their protocols. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 11 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2000191100 | Research Methodology and IPR | CO1 | Understandresearchproblemformulation and analyzeresearch relatedinformationFollowresearchethics |
| | | | | | | CO2 | Understand that today"s world is controlled by Computer, Information Technology, buttomorrowworldwill beruled byideas, concept, andcreativity. |
| | | | | | | CO3 | UnderstandingthatwhenIPRwouldtakesuchimportantplaceingrowthofindividual s& nation, it is needless to emphasis the need of information about Intellectual PropertyRighttobepromotedamongstudentsingeneral& engineeringinparticular. |
| | | | | | | CO4 | Understand that IPR protection provides an incentive to inventors for further researchworkandinvestmentinR&D,whichleadstocreationofnewandbetterprodu cts,andinturn brings about, economicgrowth andsocialbenefits. |
| 12 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2000191130 | Soft Skills (Audit course 1) | CO1 | prepare project title. |
| | | | | | | CO2 | prepare a project report. |
| | | | | | | CO3 | Identify gaps in literature. |
| | | | | | | CO4 | Improve writing and presentation skills of the project . |
| 13 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191200 | Image and video processing | CO1 | Know digital image, representation of digital image, importance of image resolution, applications in image processing, the advantages of representation of digital images in transform domain, application of various image transforms. |
| | | | | | | CO2 | Understand and analyze the image enhancement and image degradation, image restoration techniques using spatial filters and frequency domain. |
| | | | | | | CO3 | Understand and analyze the detection of point, line and edges in images, edge linking and various segmentation techniques and the redundancy in images, various image compression techniques. |
| | | | | | | CO4 | Describe the video technology from analog color TV systems to digital video systems, how video signal is sampled and filtering operations in video processing as well as describing the general methodologies for 2D motion estimation, various coding used in video processing. |
| 14 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191201 | Wireless Communications and Networks | CO1 | UnderstandCellularcommunicationconcepts |
| | | | | | | CO2 | Studythemobileradiopropagation |
| | | | | | | CO3 | Studythewireless networkdifferent typeof MAC protocols |
| | | | | | | CO4 | Determine the type and appropriate model of wireless fading channel based on the system parameters and the property of the wireless medium. |
| 15 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191250 | CMOS Analog & Digital IC Design | CO1 | Analyze, design, optimize and simulate analog and digital circuits using CMOS constrained by the design metrics. |
| | | | | | | CO2 | Connect the individual gates to form the building blocks of asystem. |
| | | | | | | CO3 | Use EDA tools like Cadence, Mentor Graphics and other open source software tools like Ngspice. |
| | | | | | | CO4 | Design Analog and digital circuits using CMOS |
| 16 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191251 | Advanced Computer Architecture | CO1 | Understand parallelism and pipelining concepts, the design aspects and challenges. |
| | | | | | | CO2 | Evaluate the issues in vector and array processors. |
| | | | | | | CO3 | Study and analyze the high performance scalable multithreaded and multiprocessor systems |
| | | | | | | CO4 | Interpret the different architecture models |
| 17 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191252 | Soft Computing Techniques | CO1 | Understand the basic concepts of Artificial neural network systems as well as understand the McCulloch-Pitts neuron model, simple and multilayer Perception, Adeline and Madeline concepts. |
| | | | | | | CO2 | Data processing, Hopfield and self-organizing network and difference between crisp sets to fuzzy sets, fuzzy models, fuzzification, inference, membership functions, rule based approaches and defuzzification and Self – organizing fuzzy logic control, non linear time delay systems. |
| | | | | | | CO3 | Understand the concept of Genetic Algorithm steps. Tabu, anD-colony search techniques for solving optimization problems. |
| | | | | | | CO4 | GA applications to power system optimization problems, identification and control of linear and nonlinear dynamic systems using MATLAB-Neural network toolbox and also know the application and importance stability analysis |
| 18 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191253 | Cyber Security | CO1 | Analyze and evaluate the cyber security needs of an organization. |
| | | | | | | CO2 | Conduct a cyber security risk assessment. |
| | | | | | | CO3 | Measure the performance and troubleshoot cyber security systems. |
| | | | | | | CO4 | Implement cyber security solutions. |

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| 19 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191254 | DSP Processors and Architectures | CO1 | Understand the basics concepts of Digital Signal Processing (DSP) and transforms. |
| | | | | | | CO2 | Distinguish between the architectural features of General purpose processors and Programmable DSP processors |
| | | | | | | CO3 | Understand the architectures of TMS320C54xx devices. |
| | | | | | | CO4 | Understand the architectures of ADSP 2100 DSP devices and Black fin Processor and interfacing various devices to DSP Processors as well as able to write simple assembly language programs using instruction set of TMS320C54xx. |
| 20 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191255 | EMI/EMC | CO1 | Understand the electromagnetic environment the definitions of EMI and EMC, history of EMI some examples of practical experiences due to EMI such as mains power supply, switches and relays etc. |
| | | | | | | CO2 | Understand the celestial electromagnetic noise the occurrence of lightning discharge and their effects, the charge accumulation and discharge in an electrostatic discharge, model ESD wave form, the various cases of nuclear explosion and the transients. |
| | | | | | | CO3 | Understand the methods to measure RE and RS in the open are test sites |
| | | | | | | CO4 | Understand the measurement facilities and procedures using anechoic chamber, TEM cell, reverberating chamber GTEM cell. |
| 21 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191256 | Object Oriented Programming | CO1 | The model of object oriented programming: abstract data types, encapsulation, inheritance and polymorphism |
| | | | | | | CO2 | Fundamental features of an object oriented language like Java: object classes and interfaces, exceptions and libraries of object collections |
| | | | | | | CO3 | How to take the statement of a business problem and from this determine suitable logic for solving the problem; then be able to proceed to code that logic as a program written in Java. |
| | | | | | | CO4 | How to test, document and prepare a professional looking package for each business project using java doc. |
| 22 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191210 | Advanced Communications Lab | CO1 | Identify the different types of network devices and their functions within anetwork. |
| | | | | | | CO2 | Understand and build the skills of sub-netting and routingmechanisms. |
| | | | | | | CO3 | Understand basic protocols of computer networks, and how they can be used to assist in network design andimplementation |
| | | | | | | CO4 | Implement the digital filters using DSP Trainer kit |
| 23 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191211 | Advanced Image Processing Lab | CO1 | Perform and analyze image and video enhancement and restoration |
| | | | | | | CO2 | Perform and analyze image and video segmentation and compression |
| | | | | | | CO3 | work and process viz., detection, extraction on the image/video |
| | | | | | | CO4 | Extract the information from the image using boundary and regional features. |
| 24 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070191270 | Mini Project(Seminar) | CO1 | Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach. |
| | | | | | | CO2 | Reproduce, improve and refine technical aspects for engineering projects. |
| | | | | | | CO3 | Work as an individual or in a team in development of technical projects. |
| | | | | | | CO4 | Communicate and report effectively project related activities and findings. |

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| 25 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2000191230 | Constitution of India (Audit course) | CO1 | Have general knowledge and legal literacy and thereby to take up competitive examinations. |
| | | | | | | CO2 | Understand state and central policies, fundamental duties. |
| | | | | | | CO3 | Understand Electoral Process, special provisions. |
| | | | | | | CO4 | Understand powers and functions of Municipalities, Panchayats and Cooperative Societies |
| 26 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070192150 | Detection & Estimation Theory | CO1 | Understand the mathematical background of signal detection an destination |
| | | | | | | CO2 | Use classical and Bayesian approaches to formulate and solve problems for signal detection and parameter estimation from noisy signals. |
| | | | | | | CO3 | Derive and apply filtering methods for parameter estimation. |
| | | | | | | CO4 | Estimate the Parameters of Random Processes from Data |
| 27 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070192151 | Advanced Digital Signal Processing | CO1 | Understand theory of different filters andalgorithms |
| | | | | | | CO2 | Understand theory of multirate DSP, solve numerical problems and writealgorithms |
| | | | | | | CO3 | Understand theory of prediction and solution of normalequations |
| | | | | | | CO4 | Estimate the Parametric Methods of Power Spectrum |
| 28 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070192152 | Coding Theory and Applications | CO1 | Learning the measurement of information and errors. |
| | | | | | | CO2 | Obtain knowledge in designing Linear Block Codes and Cyclic codes. |
| | | | | | | CO3 | Construct tree and trellies diagrams for convolution codes |
| | | | | | | CO4 | Design the Turbo codes and Space time codes and also their applications |
| 29 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070192160 | MOOCs-2 | CO1 | Connect openly on a global scale, with global learners and Instructors |
| | | | | | | CO2 | Develop high quality learning using multimedia platform |
| | | | | | | CO3 | Self assesment of their performance and learning process. |
| | | | | | | CO4 | Adapt a life long learning culture and updating the knowledge according with emerging trends |
| 33 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070192170 | Dissertation Phase -I | CO1 | Apply knowledge of Electronics and communication engineering fundamentals to solve the complex Engineering problems |
| | | | | | | CO2 | Design prototypes and solutions to solve the specific needs related with public health, safety, society and environment leading to sustainable development following ethical values |
| | | | | | | CO3 | Adapt appropriate techniques, resources and modern engineering tools during the implementation of project |
| | | | | | | CO4 | Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and self-development |
| 34 | VR19 | 70 | M.Tech - Electronics and Communication Engineering | 2070192270 | Dissertation Phase -II | CO1 | Apply knowledge of Electronics and communication engineering fundamentals to solve the complex Engineering problems |
| | | | | | | CO2 | Design prototypes and solutions to solve the specific needs related with public health, safety, society and environment leading to sustainable development following ethical values |
| | | | | | | CO3 | Adapt appropriate techniques, resources and modern engineering tools during the implementation of project |
| | | | | | | CO4 | Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and self-development |

## VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)
## DEPARTMENT OF MASTER OF BUSINESS ADMINISTRATION
## VR19- MBA COURSE OUTCOMES

| S NO | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
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| 1 | 1 E-00 | MBA-Master of Business Administration | 3099191100 | Principles of Management | CO1 | Extract Managerial skills of the students |
| | | | | | CO2 | Identify the external and internal factors that influence on organizational structure behaviors |
| | | | | | CO3 | Analyze how an organization's leaders/managers utilize job design, positional power, and goal setting/performance management to motivate employees. |
| | | | | | CO4 | Discuss leadership characteristics that produce high performing organizations. |
| 2 | 1 E-00 | MBA-Master of Business Administration | 3099191101 | Managerial Economics | CO1 | Identify the objectives, nature, scope, role & responsibilities of a manager of a business undertaking. |
| | | | | | CO2 | Predict the demand for a product or product mix of a company & to analyze various factors influencing demand elasticity. |
| | | | | | CO3 | Examine optimum production & cost functions with the help of mathematical equations & by developing graphical solutions through linear programming applications. |
| | | | | | CO4 | Discuss the concept of equilibrium price and output in different market situations i.e., perfect, monopoly, monopolistic & Oligopoly competition with the help of graphs. |
| 3 | 1 E-00 | MBA-Master of Business Administration | 3099191102 | Accounting for Managers | CO1 | Identify the types of Accounts and Principles. |
| | | | | | CO2 | Prepare Financial Statement. |
| | | | | | CO3 | Analyze the Financial Position of the Organization. |
| | | | | | CO4 | Evaluate Cost and Cost behaviour. |
| 4 | 1 E-00 | MBA-Master of Business Administration | 3099191103 | Managerial Communication & Soft Skills | CO1 | Discuss communication theories. |
| | | | | | CO2 | Display Verbal and Non-Verbal Communication |
| | | | | | CO3 | Develop Presentation Skills |
| | | | | | CO4 | Design Business Report. |
| 5 | 1 E-00 | MBA-Master of Business Administration | 3099191104 | Business Environment | CO1 | Interpret business environment and its impact |
| | | | | | CO2 | Discuss the comprehensive structure of Indian economy |
| | | | | | CO3 | Debate on various Policies |
| | | | | | CO4 | Analyze the legal Regulations pertaining to business environment |
| 6 | 1 E-00 | MBA-Master of Business Administration | 3099191105 | Operations Research for Business Decision | CO1 | Calculate descriptive statistical measures and appreciate the uses and limitations of the measures. |
| | | | | | CO2 | Formulate basic concepts of probability and theoretical probability (binomial, normal but not poisson) distributions. |
| | | | | | CO3 | To solve a simple ordinary least squares regression model with one explanatory variable, apply the model, and calculate the correlation coefficient between two variables. |
| | | | | | CO4 | Apply quantitative models (linear programming and network analysis) at an introductory level, with emphasis on relevant data and the limitations of the techniques. |
| 7 | 1 E-00 | MBA-Master of Business Administration | 3099191110 | Information Technology Lab | CO1 | Identify the softwares required for analysis. |
| | | | | | CO2 | Apply the Financial Modelling Techniques. |
| | | | | | CO3 | Evaluate data using statistical techniques. |
| | | | | | CO4 | Design the presentation using charts. |
| 8 | 1 E-00 | MBA-Master of Business Administration | 3099191180 | Employability Skills-I | CO1 | Application of consumer behavior in marketing |
| | | | | | CO2 | Analyze Individual and group determinants of consumer behavior |
| | | | | | CO3 | Evaluate Environmental influences on consumer behavior |
| | | | | | CO4 | Analyze Consumer decision making process |
| 9 | 1 E-00 | MBA-Master of Business Administration | 3099191200 | Financial Management | CO1 | Identify the sources of Finance. |
| | | | | | CO2 | Evaluate Profitable Investment Proposals. |
| | | | | | CO3 | Analyze proportions of Retention and Dividend Payout Ratio. |
| | | | | | CO4 | Design Credit Policies for Business. |
| 10 | 1 E-00 | MBA-Master of Business Administration | 3099191201 | Human Resource Management | CO1 | Identify the roles of HR Manager. |
| | | | | | CO2 | Interpret current trends and practices in the field of HR |
| | | | | | CO3 | Evaluate employee performance and organizational effectiveness |
| | | | | | CO4 | Design Compensation system for an organization. |

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| 11 | 1 E-00 | MBA-Master of Business Administration | 3099191202 | Marketing Management | CO1 | Identify core concepts of marketing and the role of marketing in business and society |
| | | | | | CO2 | Apply the Segmentation, Targeting and Positioning. |
| | | | | | CO3 | Create an integrated marketing communications plan. |
| | | | | | CO4 | Analyze marketing problems and implement marketing plans. |
| 12 | 1 E-00 | MBA-Master of Business Administration | 3099191203 | Production and Operations Management | CO1 | Identify the core features of the operations and production management. |
| | | | | | CO2 | Interpret the various parts of the operations and production management processes. |
| | | | | | CO3 | Develop an integrated framework for strategic thinking and decision making. |
| | | | | | CO4 | Illustrate operational methodologies to assess and improve an organizations performance. |
| 13 | 1 E-00 | MBA-Master of Business Administration | 3099191204 | Business Research Methodology | CO1 | Discuss the major types of Research and designs. |
| | | | | | CO2 | Formulate Research problems and measurements. |
| | | | | | CO3 | Interpret Research reports. |
| | | | | | CO4 | Caluculate Business Problems using appropriate methods. |
| 14 | 1 E-00 | MBA-Master of Business Administration | 3099191205 | Organizational Behaviour | CO1 | Identify the roles and responsibilities of Organizational Behaviour. |
| | | | | | CO2 | Display Leadership skills in an Organization. |
| | | | | | CO3 | Analyze behavioural dimensions. |
| | | | | | CO4 | Apply Interpersonal Communcation skills for Team Building. |
| 15 | 1 E-00 | MBA-Master of Business Administration | 3099191270 | Mini Project | CO1 | Conduct field survey on society/corporate/business/government/NGO. |
| | | | | | CO2 | Apply the theortical concept |
| | | | | | CO3 | Analyze and interpret the data |
| | | | | | CO4 | Prepare and present the report |
| 16 | 1 E-00 | MBA-Master of Business Administration | 3099191280 | Employability Skills-II | CO1 | Identify the importance of Comprehension & Speech Fluency |
| | | | | | CO2 | Display of Time Management Skills |
| | | | | | CO3 | Interpret ideas and information |
| | | | | | CO4 | Development of writen and oral communication |
| 17 | 1 E-00 | MBA-Master of Business Administration | 3099192100 | Strategic Management | CO1 | Identify the practical and integrative model of strategic management. |
| | | | | | CO2 | Apply the Environmental Scanning Techniques |
| | | | | | CO3 | Analyze the formulation and structure of Organizational Strategy. |
| | | | | | CO4 | Design the Organizational Strategy. |
| 18 | 1 E-00 | MBA-Master of Business Administration | 3099192101 | Legal Aspects Of Business | CO1 | Outline the Indian Contract Act. |
| | | | | | CO2 | Identify the rights of Unpaid Seller. |
| | | | | | CO3 | Discuss various aspects of Negotiable Instruments and Companies Act. |
| | | | | | CO4 | Debate on various Cyber Laws. |
| 19 | 1 E-00 | MBA-Master of Business Administration | 3099192102 | Business Ethics & Corporate Governance | CO1 | Identify the role of Ethical Values of an Organization. |
| | | | | | CO2 | Debate the global perspective of Unethical practices. |
| | | | | | CO3 | Discuss the Ethical practices in Functional areas. |
| | | | | | CO4 | Relate the role of Corporate Governance practices in Indian Industries. |
| 20 | 1 E-00 | MBA-Master of Business Administration | 3099192150 | Product Management (Marketing) | CO1 | Infer the basic concepts of Product. |
| | | | | | CO2 | Design Development of New Product. |
| | | | | | CO3 | Build the brand positioning. |
| | | | | | CO4 | Discuss the Channels of Distribution and Packaging. |
| 21 | 1 E-00 | MBA-Master of Business Administration | 3099192151 | Promotion And Distribution Management (Marketing) | CO1 | List out the various concepts of Promotion and Distribution. |
| | | | | | CO2 | Outline the challenges of Distibution System. |
| | | | | | CO3 | Discuss the various Channels of Distribution. |
| | | | | | CO4 | Debate the various ethical and social issues in Distribution Management. |
| 22 | 1 E-00 | MBA-Master of Business Administration | 3099192152 | Investment Analysis And Portfolio Management (Fin) (Elective) | CO1 | Identify different segments of Financial Markets. |
| | | | | | CO2 | Evaluation of various Asset Valuation Models. |
| | | | | | CO3 | Apply various Investment Analysis Tools. |
| | | | | | CO4 | Adopt and apply portfolio evaluation models for the realistic situations |
| 23 | 1 E-00 | MBA-Master of Business Administration | 3099192153 | Banking And Insurance (Fin) (Elective) | CO1 | Identify the fundamental concepts of Banking System in India. |
| | | | | | CO2 | Discuss the various types of Banking Funds. |
| | | | | | CO3 | Evaluate the latest regulations and innovations in Banking. |
| | | | | | CO4 | Analyze the LIC and GIC. |

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| 24 | 1 E-00 | MBA-Master of Business Administration | 3099192154 | Compensation And Performance Management (Hr) (Elective) | CO1 | Discuss concepts of compensation and designing of effective compensation system. |
| | | | | | CO2 | List out various Wage payment systems. |
| | | | | | CO3 | Evaluate administration of wage and salary. |
| | | | | | CO4 | Analyze effectiveness of performance management in an organization. |
| 25 | 1 E-00 | MBA-Master of Business Administration | 3099192155 | Management Of Industrial Relations (Hr) (Elective) | CO1 | Identify the essential concepts of industrial relations. |
| | | | | | CO2 | Discuss the Trade Unions and Work-Life Balance. |
| | | | | | CO3 | Design the Wage and Salary Administration. |
| | | | | | CO4 | Interpret and Solve the Grievances in Industries. |
| 26 | 1 E-00 | MBA-Master of Business Administration | 3099192170 | Case Study | CO1 | Conduct field survey on society/corporate/business/government/NGO. |
| | | | | | CO2 | Apply the theortical concept |
| | | | | | CO3 | Analyze and interpret the data |
| | | | | | CO4 | Prepare and present the report |
| 27 | 1 E-00 | MBA-Master of Business Administration | 3099192180 | Employability Skills-III | CO1 | Discuss and discover barriers to effective communication techniques. |
| | | | | | CO2 | Develop effective writing skills in academic and professional contexts. |
| | | | | | CO3 | Make Use English language in business communication |
| | | | | | CO4 | demostrate skills in listening comprehension, GDs and Interview. |
| 28 | 1 E-00 | MBA-Master of Business Administration | 3099192200 | Logistic and Supply Chain Management | CO1 | Acquires knowledge of the functional components within logistics to the interrelationships in the integrated supply chain. |
| | | | | | CO2 | Analyze the difference between logistics and supply chain management & gain knowledge on Benchmarking. |
| | | | | | CO3 | Evaluate warehousing and transportation options and recommend appropriate solutions for business requirement |
| | | | | | CO4 | Make use of technology in logistics and supply chain management. |
| 29 | 1 E-00 | MBA-Master of Business Administration | 3099192201 | Entrepreneurship Development | CO1 | Discuss Growth and Importance of Entrepreneurship |
| | | | | | CO2 | Explain the concept of entrepreneurship and Women entrepreneurship |
| | | | | | CO3 | Extract the essence of entrepreneurial motivation |
| | | | | | CO4 | Elucidate the problems of women entrepreneurship |
| 30 | 1 E-00 | MBA-Master of Business Administration | 3099192250 | Services Marketing (MARKETING) | CO1 | Discuss concepts and components of Services Marketing |
| | | | | | CO2 | Identify key dimensions of Services Marketing |
| | | | | | CO3 | Develop service marketing mix strategies |
| | | | | | CO4 | Evaluate the behavior of the customer and the strategies to retain them. |
| 31 | 1 E-00 | MBA-Master of Business Administration | 3099192251 | Consumer Behavior (Marketing) | CO1 | Discuss consumer behavior, models and learning process. |
| | | | | | CO2 | Analyze consumer attitude formation, change and consumer communication. |
| | | | | | CO3 | Identify psychological factors affecting consumer behavior and post purchase process. |
| | | | | | CO4 | Create awareness about consumerism and consumer protection acts. |
| 32 | 1 E-00 | MBA-Master of Business Administration | 3099192252 | International Financial Management (Fin) (Elective) | CO1 | Demonstrate the understanding of international financial theory |
| | | | | | CO2 | Illustrate applications pertaining to exchange rate determinants. |
| | | | | | CO3 | Develop a frame of reference through which to identify, evaluate, and solve problems pertaining to international financial management. |
| | | | | | CO4 | Interpret the international taxation methods and management of External Indebtness. |
| 33 | 1 E-00 | MBA-Master of Business Administration | 3099192253 | Financial Risk Management (Fin) | CO1 | Discuss risk management concepts in present business situations. |
| | | | | | CO2 | Evaluate financial risk measurement methods |
| | | | | | CO3 | Demonstrate financial risk measurement tools |
| | | | | | CO4 | Apply advanced financial risk management techniques |
| 34 | 1 E-00 | MBA-Master of Business Administration | 3099192254 | Global Human Resource Management (HR) (Elective) | CO1 | Demonstrate across a broad knowledge of HRM strategies, Policies and practices across a range of cultural and nations. |
| | | | | | CO2 | Differentiate intentional and domestic dimension of the operational aspects of HRM. |
| | | | | | CO3 | Discuss the concepts of expatriation |
| | | | | | CO4 | To analyze and apply international HRM concepts in relation to global ethical issues in the work place |

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| 35 | 1 E-00 | MBA-Master of Business Administration | 3099192255 | Management of Change and Development (HR) | CO1 | Discuss the relevance of change management approaches and models to a variety of situations where appropriate |
| | | | | | CO2 | Identify range of skills relevant to the change management process |
| | | | | | CO3 | Articulate management competencies in Organizational Development |
| | | | | | CO4 | Apply tools and models to explore underlying organizational and behavioural issues that may affect the change process |
| 36 | 1 E-00 | MBA-Master of Business Administration | 3099192256 | MOOCs | CO1 | Connect openly on a global scale, with global learners and Instructors |
| | | | | | CO2 | Develop high quality learning using multimedia platform |
| | | | | | CO3 | Self assesment of their performance and learning process. |
| | | | | | CO4 | Adapt a life long learning culture and updating the knowledge according with emerging trends |
| 37 | 1 E-00 | MBA-Master of Business Administration | 3099192270 | Major Project & Comprehensive Viva | CO1 | Conduct field survey on society/corporate/business/government/NGO. |
| | | | | | CO2 | Apply the theortical concept |
| | | | | | CO3 | Analyze and interpret the data |
| | | | | | CO4 | Prepare and present the report |
| 38 | 1 E-00 | MBA-Master of Business Administration | 3099192280 | Employability Skills-IV | CO1 | Develop value based leadership |
| | | | | | CO2 | Analyze and effective communication in the aspects of business. |
| | | | | | CO3 | Apply the knowledge of effective writing skills in business context. |
| | | | | | CO4 | Critical thinking abilities for decision making. |

# VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY
## DEPARTMENT OF MCA
## VR19 - MCA COURSE OUTCOMES

| S. NO. | Programme Code | Programme Name | Course Code | Course Name | CO | Course Outcome: After the completion of the course student will be able to |
|---|---|---|---|---|---|---|
| 1 | 1F-00 | MCA-Master of Computer Applications | 4010191101 | C Programming and Data Structures | CO1 | Analyze problems and develop solutions by writing algorithms. |
| | | | | | CO2 | Design various dynamic allocation memory programs. |
| | | | | | CO3 | Develop simple real-time applications to get familiarity of the programming environment. |
| | | | | | CO4 | Solve problems using various data structures like linear list, stack, queue, tress and graphs |
| 2 | 1F-00 | MCA-Master of Computer Applications | 4010191102 | Digital Computer Fundamentals | CO1 | Identify the logic gates and their functionality. |
| | | | | | CO2 | Perform number conversions from one system to another system. |
| | | | | | CO3 | Design basic electronic circuits (combinational circuits). |
| | | | | | CO4 | Perform a comparative analysis of the components of different memory units. |
| 3 | 1F-00 | MCA-Master of Computer Application | 4010191103 | Discrete Mathematical Structures and Graph Theory | CO1 | Analyze logical structure and able to Apply inference theory to verify the consistence of data. |
| | | | | | CO2 | Construct Hasse diagram and Understand concept of recursive functions |
| | | | | | CO3 | Understand different counting techniques. |
| | | | | | CO4 | Apply different methods to solve homogeneous and non- homogeneous recurrence relations. |
| | | | | | CO5 | Apply graph theory concepts in core subjects such as data structures and network theory effectively. |
| 4 | 1F-00 | MCA-Master of Computer Application | 4010191104 | Accounting and Financial Management | CO1 | To identify the need and the role of accounting in present modern business. |
| | | | | | CO2 | To have capabilities to preparation of trail balance – Final accounts. |
| | | | | | CO3 | Financial management role and objectives of the business. |
| | | | | | CO4 | To explain the Importance of the cost behavior |
| | | | | | CO5 | Use of the standard costing and budgeting in present business level. |
| 5 | 1F-00 | MCA-Master of Computer Application | 4010191105 | Professional Communication | CO1 | The students will be able to read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources, Social Awareness |
| | | | | | CO2 | The students will be able to analyze the functions of language and grammar in spoken and written forms. |
| | | | | | CO3 | The students will be able to write effectively on various domains. |
| | | | | | CO4 | The students will be able to prepare and exhibit oral presentation skills by using ICT.(Individual/Team) |

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| 6 | 1F-00 | MCA-Master of Computer Application | 4010191121 | English Language Communication Skills Lab | CO1 | Use English language fluently, accurately and appropriately. |
| | | | | | CO2 | Demonstrate skills in Reading, listening comprehension, GDs and Interview. |
| | | | | | CO3 | Read and answer questions (orally and in writing) based on passages. |
| | | | | | CO4 | Show effective writing skills in academic and professional contexts. |
| 7 | 1F-00 | MCA-Master of Computer Application | 4010191122 | C Programming and Data Structures Lab | CO1 | Able to write programs in C Language |
| | | | | | CO2 | Develop logical and analytical thinking in C |
| | | | | | CO3 | Knowledge in writing programs in various concepts like arrays, functions, pointer etc. |
| | | | | | CO4 | How to read and write contents from or into a file |
| 8 | 1F-00 | MCA-Master of Computer Application | 4010191123 | IT Workshop Lab | CO1 | Identify the basic peripherals, assembling a Personal Computer, Installation of system software like MS Windows, device drivers. |
| | | | | | CO2 | Troubleshoot Hardware and software. |
| | | | | | CO3 | Analyze different ways of hooking the PC on to the internet from home and workplace effectively, Usage of the internet, web browsers, email, newsgroups and discussion forums. |
| | | | | | CO4 | Get awareness about "Cyber hygiene" (protecting the personal computer from getting infected with viruses), worms and other cyber-attacks. |
| | | | | | CO5 | Crafting professional word documents, Excel spread sheets, Power point presentations and personal web sites using the Microsoft suite of office tools. |
| 9 | 1F-00 | MCA-Master of Computer Application | 4010191201 | OOPS Through JAVA | CO1 | Apply OOP concepts and basics of Java programming. |
| | | | | | CO2 | Use the concepts of Java programming in problem solving. |
| | | | | | CO3 | Extend the knowledge of Java programming in developing futuristic applications. |
| 10 | 1F-00 | MCA-Master of Computer Application | 4010191202 | Operating Systems | CO1 | Apply optimization techniques for the improvement of system performance. |
| | | | | | CO2 | Design and solve synchronization problems. |
| | | | | | CO3 | Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput by keeping CPU as busy as possible. |
| | | | | | CO4 | Change access controls to protect files. |
| | | | | | CO5 | Analyze the different operating systems. |
| 11 | 1F-00 | MCA-Master of Computer Application | 4010191203 | Software Engineering | CO1 | Prepare a Software Requirement Specification (SRS) document for any software project. |
| | | | | | CO2 | Identify the importance of system analysis and design in solving complex problems. |
| | | | | | CO3 | Distinguish between object-oriented approach and traditional approach in system analysis and design. |
| | | | | | CO4 | Analyze various metrics to measure software product size and complexity. |

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| 12 | 1F-00 | MCA-Master of Computer Application | 4010191204 | Operations Research | CO1 | Analyze Different transportation models |
| | | | | | CO2 | Design inventory and queueing theroy models for optimal decisions |
| | | | | | CO3 | Apply optimal strategy to real time applications using dynamic programming and game theory |
| | | | | | CO4 | understand the basic s of Computer Graphics |
| 13 | 1F-00 | MCA-Master of Computer Application | 4010191205 | Database Management Systems | CO1 | give a description of the Architecture of Database Management Systems |
| | | | | | CO2 | understand the applications of Databases and functions of DBA |
| | | | | | CO3 | know the advantages and disadvantages of the different models |
| | | | | | CO4 | compare relational model with the structured query language (SQL) |
| | | | | | CO5 | know the various constraints associated with relational database model |
| | | | | | CO6 | know the rules guiding transaction ACID |
| | | | | | CO7 | understand the concept of data planning and database design |
| 14 | 1F-00 | MCA-Master of Computer Application | 4010191221 | OOPS Through JAVA Lab | CO1 | write simple programs in Java Language |
| | | | | | CO2 | Develop logical and analytical thinking in Java |
| | | | | | CO3 | Knowledge in writing programs in various concepts like Exception Handling, applets, swings etc. |
| | | | | | CO4 | Design to read and write contents from or into a file |
| 15 | 1F-00 | MCA-Master of Computer Application | 4010191222 | Database Management Systems Lab | CO1 | Demonstrate knowledge of artistic and design components that are used in the creation of a web site |
| | | | | | CO2 | Utilize and apply the technical, ethical and interpersonal skills needed to function in a cooperative environment |
| | | | | | CO3 | Experiment Unix utilities and perform basic shell control of the utilities |
| | | | | | CO4 | Create effective file access control methods for handling Unix file system. |
| 16 | 1F-00 | MCA-Master of Computer Application | 4010191223 | Operating System Lab | CO1 | Implement CPU scheduling algorithms and Bankers algorithm used for deadlock avoidance |
| | | | | | CO2 | Implement CPU scheduling algorithms and Bankers algorithm used for deadlock prevention. |
| 17 | 1F-00 | MCA-Master of Computer Application | 4010192101 | Advanced Java & Web Technologies | CO1 | Implement web based applications using features of HTML. |
| | | | | | CO2 | Develop reusable component for Graphical User Interface applications |
| | | | | | CO3 | Apply the concepts of server side technologies for dynamic web applications. |
| | | | | | CO4 | Implement the web based applications using effective data base access with rich client interaction. |

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| 18 | 1F-00 | MCA-Master of Computer Application | 4010192102 | Object Oriented Analysis and Design | CO1 | Possess an ability to practically apply knowledge software engineering methods, such as object-oriented analysis and design methods with a clear emphasis on UML |
| | | | | | CO2 | Have a working ability and grasping attitude to design and conduct object-oriented analysis and design experiments using UML, as well as to analyze and evaluate their Models. |
| | | | | | CO3 | Display an ability to identify, formulate and solve software development problems: software requirements, specification (problem space), Software design, and implementation (solution space). |
| | | | | | CO4 | Show an ability to use the graphical UML representation using tools, such as IBM's Rational Rose or Microsoft's Vision. |
| 19 | 1F-00 | MCA-Master of Computer Application | 4010192103 | UNIX Programming | CO1 | Understand Fundamental Network Design Principles |
| | | | | | CO2 | Understand All the Unix Utilities, and Implement Shell Scripting |
| | | | | | CO3 | Differentiate Connection Oriented and Connection less Network Communication |
| | | | | | CO4 | Understands the Concept of Process Threads and File Structure |
| | | | | | CO5 | Design Various Client Server Applications Using TCP or UDP Protocols |
| 20 | 1F-00 | MCA-Master of Computer Application | 4010192104 | Principles and Practices of Management | CO1 | Understand what is management and evolution of management thought |
| | | | | | CO2 | Importance of planning and decision making in organizations |
| | | | | | CO3 | Process of organizing and delegation of authority |
| | | | | | CO4 | Theories of motivation and leadership styles |
| | | | | | CO5 | Coordination and control process in the organizations |
| 21 | 1F-00 | MCA-Master of Computer Application | 4010192105 | Design and Analysis of Algorithms | CO1 | Basic data structure and it working topological design. |
| | | | | | CO2 | Basic functionality of different type of algorithms and its usage |
| | | | | | CO3 | Analysis of different type of complexity and its applicable condition |
| | | | | | CO4 | Able to design algorithm |
| 22 | 1F-00 | MCA-Master of Computer Application | 4010192121 | Advanced Java & Web Technologies Lab | CO1 | Implement sophisticated Java applications and well-organized, complex computer programs with both command line and graphical user interfaces. |
| | | | | | CO2 | Learn to access database through Java programs, using Java Data Base Connectivity (JDBC). |
| | | | | | CO3 | Create dynamic web pages, using Servlets and JSP & make a reusable software component, using Java Bean. |
| | | | | | CO4 | Understand the multi-tier architecture of web-based enterprise applications. |

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| 23 | 1F-00 | MCA-Master of Computer Application | 4010192122 | Object Oriented Analysis and Design Lab | CO1 | Understand the Case studies and design the Model. |
| | | | | | CO2 | Understand how design patterns solve design problems. |
| | | | | | CO3 | Develop design solutions using creational patterns. |
| | | | | | CO4 | Construct design solutions by using structural and behavioral patterns |
| 24 | 1F-00 | MCA-Master of Computer Application | 4010192123 | UNIX Programming Lab | CO1 | You will be able to run various UNIX commands on a standard UNIX/LINUX Operating System (We will be using Ubuntu flavor of the Linux operating system). |
| | | | | | CO2 | You will be able to run C / C++ programs on UNIX. |
| | | | | | CO3 | You will be able to do shell programming on UNIX OS. |
| | | | | | CO4 | You will be able to understand and handle UNIX system calls |
| 25 | 1F-00 | MCA-Master of Computer Application | 4010192201 | Computer Networks | CO1 | Students will able to understand the network topology and its structure |
| | | | | | CO2 | Students will able to understand different types of network standards and protocols |
| | | | | | CO3 | Students will able design new routing technique base on exiting study |
| | | | | | CO4 | Students will able to understand the application of networks in MANETS, Adhoc Networks, Wireless Sensors network etc. |
| 26 | 1F-00 | MCA-Master of Computer Application | 4010192202 | Python Programming | CO1 | Construct Software easily right out of the box |
| | | | | | CO2 | Experiment with an interpreted Language |
| | | | | | CO3 | Build software for real needs |
| | | | | | CO4 | Explain to testing Orielly |
| 27 | 1F-00 | MCA-Master of Computer Application | 4010192203 | Data warehousing and Mining | CO1 | Ability to identify, understand and investigate various patterns that can be extracted from different types of data. |
| | | | | | CO2 | Apply various pre-processing techniques and classification algorithms on different domains of data |
| | | | | | CO3 | Build decision making systems using data mining algorithms for a given real time data set. |
| | | | | | CO4 | Construct models using modern tools such as WEKA, R and python etc. |
| 28 | 1F-00 | MCA-Master of Computer Application | 4010172404 | Statistical Programming with R | CO1 | Understand the basics of R programming |
| | | | | | CO2 | Knowledge on R programming control statements |
| | | | | | CO3 | Knowledge on Graphics |
| | | | | | CO4 | Awareness on statistical concepts |
| 29 | 1F-00 | MCA-Master of Computer Application | 4010172405 | Network Programming | CO1 | Ability to understand and reason out the working of network Systems. |
| | | | | | CO2 | To teach students the use of basic socket programming Utilities. |
| | | | | | CO3 | To teach students the principles of socket programming |
| | | | | | CO4 | To familiarize students with the concepts, design, and structure of the TCP/UDP programming. |
| | | | | | CO5 | To be able to build an application of UNIX programming in socket. |

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| 30 | 1F-00 | MCA-Master of Computer Application | 4010172406 | Cloud Computing | CO1 | Understand the systems, protocols and mechanisms to support cloud computing. |
| | | | | | CO2 | Develop applications for cloud computing by using platforms and technologies. |
| | | | | | CO3 | Understand the hardware requirements for cloud computing. |
| | | | | | CO4 | Understand the cloud security risks |
| 31 | 1F-00 | MCA-Master of Computer Application | 4010172407 | Software Project Management | CO1 | Basic Knowledge on software Engineering |
| | | | | | CO2 | Basic knowledge on project goals |
| | | | | | CO3 | Implement basic AI algorithms |
| 32 | 1F-00 | MCA-Master of Computer Application | 4010172408 | Artificial Intelligence | CO1 | Describe the modern view of AI as the study of agents that receive percepts and perform Actions |
| | | | | | CO2 | Apply AI search Models and Generic Search strategies |
| | | | | | CO3 | Inspect and analyze Logic for representing Knowledge and Reasoning of AI systems. |
| | | | | | CO4 | Evaluate the searching strategies for given situation to achieve the goal. |
| | | | | | CO5 | Design different learning algorithms for improving the performance of AI systems. |
| | | | | | CO6 | Conduct investigation and implement projects using different AI learning techniques |
| 33 | 1F-00 | MCA-Master of Computer Application | 4010172409 | Mobile Application Development | CO1 | Get familiarity with the Android operating system development environment. |
| | | | | | CO2 | Create user-friendly mobile user interfaces and views. |
| | | | | | CO3 | Develop basic Android applications for mobiles. |
| 34 | 1F-00 | MCA-Master of Computer Application | 4010192221 | Python Programming Lab | CO1 | understand and reason out the working of network Systems |
| | | | | | CO2 | Implement basic socket programming Utilities |
| | | | | | CO3 | familiarize students with the concepts, design, and structure of the TCP/UDP programming. |
| | | | | | CO4 | build an application of UNIX programming in socket |
| 35 | 1F-00 | MCA-Master of Computer Application | 4010192222 | Data Warehousing and Mining Lab | CO1 | Construct Software easily right out of the box |
| | | | | | CO2 | Experiment with an interpreted Language |
| | | | | | CO3 | Build software for real needs |
| | | | | | CO4 | develop database applications in Python |
| 36 | 1F-00 | MCA-Master of Computer Application | 4010192223 | Soft Skills Lab | CO1 | Use English language fluently, accurately and appropriately. |
| | | | | | CO2 | Discuss and discover barriers to effective communication. |
| | | | | | CO3 | Demonstrate skills in listening comprehension, GDs and Interview. |
| | | | | | CO4 | Read and answer questions (orally and in writing) based on passages. |
| | | | | | CO5 | Show effective writing skills in academic and professional contexts |

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| 37 | 1F-00 | MCA-Master of Computer Application | 4010192231 | Mini Project/ Online Certification Course form NPTEL or equivalent on any programming language | CO1 | Develop skills in distinguishing various types of computer crimes and identify the digital fingerprints associated with criminal activities |
| | | | | | CO2 | Illustrate how to apply different forensic analysis tools to recover important evidence for identifying computer crimes |
| | | | | | CO3 | Explain about threats and compare various threats. |
| | | | | | CO4 | Summarize the need for surveillance and list the tools used |
| 38 | 1F-00 | MCA-Master of Computer Application | 4010193101 | Big Data Analytics | CO1 | Preparing for data summarization, query, and analysis. |
| | | | | | CO2 | Applying data modeling techniques to large data sets |
| | | | | | CO3 | Creating applications for Big Data analytics |
| | | | | | CO4 | Building a complete business data analytic Solution |
| 39 | 1F-00 | MCA-Master of Computer Application | 4010193102 | Internet of Things | CO1 | Understand the IOT connectivity principles and application areas. |
| | | | | | CO2 | Conceptually identify revolution of IOT in cloud, wireless sensors including recent attacks involving the Internet of Things. |
| | | | | | CO3 | Build a real time IOT application. |
| 40 | 1F-00 | MCA-Master of Computer Application | 4010193103 | Cryptography and Network Security | CO1 | Understand the concepts of need of security in real time applications |
| | | | | | CO2 | To analyze the use of different security techniques in diverse applications |
| | | | | | CO3 | Students will get the knowledge of advance security algorithm with respect to applications security |
| | | | | | CO4 | Awareness of different types of security threats and virtual enemy with possible solutions |
| 41 | 1F-00 | MCA-Master of Computer Application | 4010173504 | Cyber Security | CO1 | Understand the basics Concepts of Cyber threats and security with forensics procedure |
| | | | | | CO2 | Students will get the Knowledge of Cyber forensic standard procedures and policy |
| | | | | | CO3 | To get the knowledge the cyber threats and cyber law |
| | | | | | CO4 | To understand the specific circumstances of cyber threats |
| 42 | 1F-00 | MCA-Master of Computer Application | 4010173505 | Advanced Mobile Application Development | CO1 | Create Image Gallery for online Shopping in Grid view. |
| | | | | | CO2 | Create menus for any one standard mobile application. |
| | | | | | CO3 | Design and develop contacts mobile application using SQLite Database. |
| | | | | | CO4 | Implement an Android program for HTTP Connection |
| | | | | | CO5 | Design and develop simple charting mobile app using socket programming |
| | | | | | CO6 | Create the APK file for all the above mobile experiments and create signature certificates |

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| 43 | 1F-00 | MCA-Master of Computer Application | 4010173506 | E-Commerce | CO1 | To know and understand the critical success factors in implementing an ecommerce system. |
| | | | | | CO2 | To know how to plan and how to manage e-commerce solutions. |
| | | | | | CO3 | To apply processes of e-commerce. |
| | | | | | CO4 | To analyze and understand the human, technological and business environment associated with e-commerce. |
| 44 | 1F-00 | MCA-Master of Computer Application | 4010173507 | Web Scripting Through PHP & MYSQL | CO1 | To know how to use technologies to build e-commerce websites. |
| | | | | | CO2 | Work with HTML forms and handling HTML forms using PHP |
| | | | | | CO3 | Familiar with MYSQL database and perform insert, update and delete operations on DBMS tables. |
| | | | | | CO4 | Implement and debug programs in PHP and MYSQL for a specific application. |
| 45 | 1F-00 | MCA-Master of Computer Application | 4010173508 | Multimedia Application Development | CO1 | To learn and understand technical aspect of Multimedia Systems. |
| | | | | | CO2 | To understand the standards available for different audio, video and text applications. |
| | | | | | CO3 | To Design and develop various Multimedia Systems applicable in real time. |
| | | | | | CO4 | To learn various multimedia authoring systems. |
| | | | | | CO5 | To understand various networking aspects used for multimedia applications. |
| | | | | | CO6 | To develop multimedia application and analyze the performance of the same. |
| 46 | 1F-00 | MCA-Master of Computer Application | 4010173509 | Human Computer Interaction | CO1 | Design and Development processes and life cycle of Human Computer Interaction |
| | | | | | CO2 | Analyze product usability evaluations and testing methods. |
| | | | | | CO3 | Apply the interface design standards/guidelines for cross cultural and disabled users. |
| | | | | | CO4 | Categorize, Design and Develop Human Computer Interaction in proper architectural structure. |
| 47 | 1F-00 | MCA-Master of Computer Application | 4010193121 | Big Data Analytics Lab | CO1 | To understand the basic principles, concepts of Big Data Analyze and interpret data using an ethically responsible approach. |
| | | | | | CO2 | Collect, manage, store, query, and analyze various form of big data |
| | | | | | CO3 | Gain hands-on experience on large-scale analytics tools to solve some open big data problems |
| | | | | | CO4 | Understand the impact of big data for business decisions and strategy. |

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| 48 | 1F-00 | MCA-Master of Computer Application | 4010193122 | IOT Lab | CO1 | Identify problems that are amenable to solution by various methods, and which different methods may be suited to solving a given problem. |
| | | | | | CO2 | Formalize a given problem in the language/framework of different methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc). |
| | | | | | CO3 | Implement basic algorithms (e.g., standard search algorithms or dynamic programming). |
| | | | | | CO4 | Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports. |
| 49 | 1F-00 | MCA-Master of Computer Application | 4010193123 | Network Security & Cryptography Lab | CO1 | Develop solutions for encryption and decryption algorithms |
| | | | | | CO2 | Develop solutions for public key encryption techniques |
| | | | | | CO3 | Develop solutions for private key encryption techniques |
| | | | | | CO4 | Develop a solutions for real time cryptographic problems. |
| 50 | 1F-00 | MCA-Master of Computer Application | 4010193232 | Technical Seminar on Latest Technologies/Certification Course | CO1 | Identify and understand assumptions, theses, and arguments that exist in the work of authors. |
| | | | | | CO2 | Extend intellectual discovery and unravel complexities of thought. |
| | | | | | CO3 | Evaluate initial hypotheses in light of evidence and collaborative discussion with the goal of making considered judgments. |
| | | | | | CO4 | Improve reflective listening and inclusive, respectful conversation |
| 51 | 1F-00 | MCA-Master of Computer Application | 4010193237 | Internship | CO1 | Apply domain knowledge during the course of internship |
| | | | | | CO2 | Develop/implement the solutions with appropriate techniques, resources and contemporary tools. |
| | | | | | CO3 | Work independently and in a collaboration in multidisciplinary environment and to allocate time effectively and manage to complete the work allotted within stipulated time. |
| | | | | | CO4 | Exhibit integrity and ethical behavior while carrying out the internship and for the preparation of internship report and to demonstrate effective oral and written communication skills |
| 52 | 1F-00 | MCA-Master of Computer Application | 4010193238 | Internship /Major Project | CO1 | Analyze a complex computing problem and to apply software engineer principles in design and investigation of optimized solutions. |
| | | | | | CO2 | Investigate and develop computing-based solution using mordern tools that help in sustaining environment and society. |
| | | | | | CO3 | Use formal and informal discussions with team members and guide, make presentations and prepare technical document. |
| | | | | | CO4 | Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles. |