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.

VR21 - Regulation

COURSE OUTCOMES

(M. Tech & MBA)

JYOTHULA SUDHAKAR

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Course Outcomes of VR21 Regulation

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VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)
DEPARTMENT OF MECHANICAL ENGINEERING
VR21 - 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	VR21	15	M.Tech - Machine Design	2015211100	Advanced Mechanics of Solids	CO1	Solve stress, strain calculations.
						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.
2	VR21	15	M.Tech - Machine Design	2015211101	Mechanical Vibrations and Acoustics	CO1	Understand the basic concepts of Acoustics and Noise, noise measuring instruments and control the noise using different 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.
3	VR21	15	M.Tech - Machine Design	2015211150	Design of Automobile Systems (Elective-1)	CO1	Understand the safety and conceptual design of Automobiles.
						CO2	Evaluate design of structural elements and load analysis for different vehicles based on cornering loads.
						CO3	Understand Vehicle ergonomics, Suspension system for ride comfort and methods of mounting suspension systems.
						CO4	Analyze Safety aspects of automobiles and energy absorbing systems through testing(lab, field testing).
4	VR21	15	M.Tech - Machine Design	2015211151	Product Design (Programme Elective– I)	CO1	To understand the basic concept a product design based on the requirement.
						CO2	Generate the concept of new product and different fabrication process.
						CO3	Make the solid model in virtual platform and evaluate the product using computer software.
						CO4	Selecting the correct process of fabrication to optimize the cost and quality.
5	VR21	15	M.Tech - Machine Design	2015211152	Design for Manufacturing & Assembly (Programme Elective– I)	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.
6	VR21	15	M.Tech - Machine Design	2015211153	Fracture Mechanics (Programme Elective– I)	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.
7	VR21	15	M.Tech - Machine Design	2015211154	Advanced Mechanisms (Programme Elective– I)	CO1	Understand the various degrees of 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 manipulator kinematics with D-H notation.

8	VR21	15	M.Tech - Machine Design	2015211155	Non –Destructive Evaliation (Programme Elective– II)	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	Demonstrate comprehensive understanding of Ultrasonic techniques.
						CO4	Summarize the various techniques of optical holography and electron beam holography.
9	VR21	15	M.Tech - Machine Design	2015211156	Robotics (Programme Elective– II)	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.
10	VR21	15	M.Tech - Machine Design	2015211157	Geometric Modeling (Programme Elective– II)	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	Implement the surface modeling for design of various consumer products.
11	VR21	15	M.Tech - Machine Design	2015211158	Multi Body Dynamics (Programme Elective– II)	CO1	Understand the basic theory of kinematics and dynamics.
						CO2	To meet desired needs and solve engineering problems.
						CO3	Understand and implement the dynamics of the planar and spatial systems.
						CO4	Inverse dynamic analysis and forward dynamic analysis of the planar systems.
12	VR21	15	M.Tech - Machine Design	2015211159	Gear Engineering (Programme Elective– II)	CO1	Organize the gear production processes.
						CO2	Inspect the gear wheel for its correct profile.
						CO3	Decide the type of gear used for a particular application.
						CO4	Propose a correct gear for transmitting the various loads coming on to the gear.
13	VR21	15	M.Tech - Machine Design	2015211110	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.
14	VR21	15	M.Tech - Machine Design	2015211111	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	Construct the final component in all the parameters.
15	VR21	15	M.Tech - Machine Design	2000211100	Research Methodology and IPR	CO1	Construct the concept of modern research.
						CO2	Develop the research ethics.
						CO3	Design the steps involved in effective technical writing.
						CO4	Predict the concept of Patents in biological and computer softwares.
16	VR21	15	M.Tech - Machine Design	2000211130	Soft Skills	CO1	Effectively communicate through verbal/oral communication and improve the listening skills.
						CO2	Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
						CO3	Become more effective individual through goal/target setting, self-motivation and practicing creative thinking.
						CO4	Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.

17	VR21	15	M.Tech - Machine Design	2015211200	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 isoperimetric 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.
18	VR21	15	M.Tech - Machine Design	2015211201	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.
19	VR21	15	M.Tech - Machine Design	2015211250	Theory of Plasticity (Programme Elective - III)	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.
20	VR21	15	M.Tech - Machine Design	2015211251	Signal Analysis and Condition Monitoring (Programme Elective - III)	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.
21	VR21	15	M.Tech - Machine Design	2015211252	Computational Fluid Dynamics (Programme Elective - III)	CO1	Understant the continuum mechanics.
						CO2	Generate the concept of new product and different fabrication 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.
22	VR21	15	M.Tech - Machine Design	2015211253	Composite Materials (Programme Elective - III)	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.
23	VR21	15	M.Tech - Machine Design	2015211254	Continuum Mechanics (Programme Elective - III)	CO1	Understand the continuum mechanics.
						CO2	Solve the continuum mechanics problem using Eulerian and Lagrangian description.
						CO3	Use the laws of continuum mechanics for mass conservation and energy conversion.
						CO4	Use the continuum mechanics theories for Elastic Materials, Viscous fluids, linear visco-elasticity.
24	VR21	15	M.Tech - Machine Design	2015211255	Experimental Techniques and Data Analysis (Programme Elective - IV)	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
25	VR21	15	M.Tech - Machine Design	2015211256	Design with advanced materails (Programme Elective - IV)	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.

26	VR21	15	M.Tech - Machine Design	2015211257	Desing Synthesis (Programme Elective - IV)	CO1	Describe the role of analysis and synthesis in the design process.
						CO2	Understand Tolerance from process and function.
						CO3	Describe the design methods for forging, assembly and dismantling process.
						CO4	Develop problems formulation for design optimization.
27	VR21	15	M.Tech - Machine Design	2015211258	Tribology (Programme Elective - IV)	CO1	Illustrate the fundamentals of tribology and the tribological parameters of all classes of materials.
						CO2	Explain about various Lubrication Techniques.
						CO3	Demonstrate about bearing properties and analyze about bearing failure.
						CO4	Classify different types of seals and its uses.
28	VR21	15	M.Tech - Machine Design	2015211259	Experimental Modal Analysis (Programme Elective - IV)	CO1	Understand different modal analysis: Vibrations of single and multiple degree of freedom.
						CO2	Analyze Frequency response functions measurement.
						CO3	Understand Inverse Method, Residuals MDOF, curve-fitting procedures.
						CO4	Apply Model correlation and modal assurance criterion for variants.
29	VR21	15	M.Tech - Machine Design	2015211210	Computational mathematics lab	CO1	Apply MATLAB and Python code for solving a system of linear equation using Gauss Elimination Method.
						CO2	Apply MATLAB and Python code for Iterative methods to solve equations using Jacob iteration.
						CO3	Apply MATLAB and Python code for Matrices and Eigenvalues.
						CO4	Apply MATLAB and Python code for Partial Differential equations.
30	VR21	15	M.Tech - Machine Design	2015211211	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	Construct the final component in all the parameters.
31	VR21	15	M.Tech - Machine Design	2000191230	Constitution of India	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.
32	VR21	15	M.Tech - Machine Design	2015212150	Industrial robotics (Programme Elective-V)	CO1	Summarize robot components, configurations and different end effectors.
						CO2	Formulate the kinematics and dynamics of a manipulator.
						CO3	Write a program to manipulate the end effector of a robot to move along a specified path.
						CO4	Select a robot for a given industrial application and design its cell layout.
33	VR21	15	M.Tech - Machine Design	2015212151	Advanced optimization techniques (Programme Elective -V)	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.
34	VR21	15	M.Tech - Machine Design	2015212152	Additive manufacturing (Programme Elective- V)	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.
35	VR21	15	M.Tech - Machine Design	2015212153	Mechanics of composite materials (Programme Elective -V)	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.
36	VR21	15	M.Tech - Machine Design	2015212154	Pressure Vessel Desing (Programme Elective-V)	CO1	To identify different materials of pressure vessels and select the materials based on application.
						CO2	Design dome bends, shell connections, flat heads and cone openings.
						CO3	Analyze the discontinuity stresses in vessels.
						CO4	Evaluate the stress theory of failure of vessels subject to steady state and fatigue conditions.

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)
DEPARTMENT OF CIVIL ENGINEERING
VR21 - M.Tech - Transportation 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	VR21	22	M.Tech - Transportation Engineering	2022211100	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	VR21	22	M.Tech - Transportation Engineering	2022211101	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	VR21	22	M.Tech - Transportation Engineering	2022211150	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	VR21	22	M.Tech - Transportation Engineering	2022211151	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	VR21	22	M.Tech - Transportation Engineering	2022211152	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	VR21	22	M.Tech - Transportation Engineering	2022211153	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	VR21	22	M.Tech - Transportation Engineering	2022211154	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.
8	VR21	22	M.Tech - Transportation Engineering	2022211155	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	VR21	22	M.Tech - Transportation Engineering	2022211110	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	VR21	22	M.Tech - Transportation Engineering	2022211111	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	VR21	22	M.Tech - Transportation Engineering	2000211100	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	VR21	22	M.Tech - Transportation Engineering	2000211130	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	VR21	22	M.Tech - Transportation Engineering	2022211200	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	VR21	22	M.Tech - Transportation Engineering	2022211201	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	VR21	22	M.Tech - Transportation Engineering	2022211250	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	VR21	22	M.Tech - Transportation Engineering	2022211251	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.
17	VR21	22	M.Tech - Transportation Engineering	2022211252	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	VR21	22	M.Tech - Transportation Engineering	2022211253	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	VR21	22	M.Tech - Transportation Engineering	2022211254	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	VR21	22	M.Tech - Transportation Engineering	2022211255	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	VR21	22	M.Tech - Transportation Engineering	2022211210	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	VR21	22	M.Tech - Transportation Engineering	2022211211	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	VR21	22	M.Tech - Transportation Engineering	2000211230	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	VR21	22	M.Tech - Transportation Engineering	2022211270	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	VR21	22	M.Tech - Transportation Engineering	2022212150	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.
26	VR21	22	M.Tech - Transportation Engineering	2022212151	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	VR21	22	M.Tech - Transportation Engineering	2022212152	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	VR21	22	M.Tech - Transportation Engineering	2022211152	Numerical Methods and Applied Statics	CO1	Apply the different numerical techniques to transportation problems.
						CO2	Understand applications of probability theory.
						CO3	Use regression analysis to process transportation data.
						CO4	Use correlation analysis to process transportation data.
29	VR21	22	M.Tech - Transportation Engineering	2022212160	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	VR21	22	M.Tech - Transportation Engineering	2022212170	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	VR21	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 ELECTRONICS AND COMMUNICATION ENGINEERING							
VR21 - M.Tech - DECS Course Outcomes							
S.NO	**Regulation**	**Program Code**	**Programme Name**	**Course Code**	**Course Name**	**COs**	**Course Outcomes (COs)**
1	VR21	38	M.Tech. DECS	2038211100	Digital System Design using VHDL	CO1	Understand Basics of VHDL Programming .
						CO2	Use VHDL simulate and validate the circuit design.
						CO3	Design and analyze combinational circuits using VHDL.
						CO4	Design and analyze sequential circuits using VHDL.
2	VR21	38	M.Tech. DECS	2038211101	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 plementation.
3	VR21	38	M.Tech. DECS	2038211150	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 such as wavelet packets,Bi-orthogonal wavelets e.t.c.
4	VR21	38	M.Tech. DECS	2038211151	VLSI Technology and Design	CO1	Review of FET fundamentals for VLSI design.
						CO2	To acquires knowledge about stick diagrams and layouts.
						CO3	Enable to design the sub systems based on VLSI concepts.
						CO4	Analyse the floor planning methods.
5	VR21	38	M.Tech. DECS	2038211152	Radar Signal Processing	CO1	Know the significance and types of pulse compression techniques for analog and digital signals and phase coding in Radarand various polyphase codes used for phasecoding.
6	VR21	38	M.Tech. DECS	2038211153	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	VR21	38	M.Tech. DECS	2038211154	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	VR21	38	M.Tech. DECS	2038211155	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	VR21	38	M.Tech. DECS	2038211110	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	Xilinx.
						CO4	Apply verilog programming tools to implement different applications.
10	VR21	38	M.Tech. DECS	2038211111	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	VR21	38	M.Tech. DECS	2000211100	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	VR21	38	M.Tech. DECS	2000211130	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	VR21	38	M.Tech. DECS	2038211200	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	VR21	38	M.Tech. DECS	2038211201	Wireless Communications and Networks	CO1	Understand Cellular communication concepts.
						CO2	Study the mobile radio propagation.
						CO3	Study the wireless network different 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	VR21	38	M.Tech. DECS	2038211250	Digital Controllers	CO1	Explain the architecture of 8086 microprocessors.
						CO2	Explain the instruction set architecture of microprocessor and microcontrollers.
						CO3	Write /create programming for the microprocessor and microcontrollers using assembly language.
						CO4	Design interface between I/O devices and microcontrollers.
16	VR21	38	M.Tech. DECS	2038211251	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	VR21	38	M.Tech. DECS	2038211252	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	VR21	38	M.Tech. DECS	2038211253	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	VR21	38	M.Tech. DECS	2038211254	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	VR21	38	M.Tech. DECS	2038211255	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	VR21	38	M.Tech. DECS	2038211256	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	VR21	38	M.Tech. DECS	2070211210	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	VR21	38	M.Tech. DECS	2038211211	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	VR21	38	M.Tech. DECS	2038211238	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	VR21	38	M.Tech. DECS	2000211230	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	VR21	38	M.Tech. DECS	2038212150	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	VR21	38	M.Tech. DECS	2038212151	Advanced Digital Signal Processing	CO1	Understand theory of different filters and algorithms.
						CO2	Understand theory of multirate DSP, solve numerical problems and write algorithms.
						CO3	Understand theory of prediction and solution of normalequations.
						CO4	Estimate the Parametric Methods of Power Spectrum.
28	VR21	38	M.Tech. DECS	2038212152	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	VR21	38	M.Tech. DECS	2038212160	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.
30	VR21	38	M.Tech. DECS	2038212138	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.
31	VR21	38	M.Tech. DECS	2038212238	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 (A)
DEPARTMENT OF INFORMATION TECHNOLOGY
VR21 - M.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	VR21	40	M.Tech-Information Technology	2040211100	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.
2	VR21	40	M.Tech-Information Technology	2040211101	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	VR21	40	M.Tech-Information Technology	2040211150	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	VR21	40	M.Tech-Information Technology	2040211151	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	VR21	40	M.Tech-Information Technology	2040211152	Software Quality Assurance and Testing	CO1	Apply modern software testing processes in relation to software development and project management.
						CO2	Create test strategies and plans, design test cases, prioritize and execute them.
						CO3	Manage incidents and risks within a project.
						CO4	Contribute to efficient delivery of software solutions and implement improvements in the software development processes.
6	VR21	40	M.Tech-Information Technology	2040211153	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.
7	VR21	40	M.Tech-Information Technology	2040211154	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	VR21	40	M.Tech-Information Technology	2040211155	Data Preparation & Analysis	CO1	Ability to gather and preparation of data .
						CO2	Ability to clean the data for visualization.
						CO3	Ability to exploratory analysis of data.
						CO4	Ability to visualization of data.
9	VR21	40	M.Tech-Information Technology	2040211156	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	VR21	40	M.Tech-Information Technology	2040211157	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.
11	VR21	40	M.Tech-Information Technology	2040211158	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	VR21	40	M.Tech-Information Technology	2040211159	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	VR21	40	M.Tech-Information Technology	2000211100	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	VR21	40	M.Tech-Information Technology	2040211110	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	VR21	40	M.Tech-Information Technology	2040211111	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	VR21	40	M.Tech-Information Technology	2000211130	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	VR21	40	M.Tech-Information Technology	2000211131	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.
						CO4	Technological innovations in Disaster Risk Reduction: Advantages and problems.

18	VR21	40	M.Tech-Information Technology	2000211132	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	VR21	40	M.Tech-Information Technology	2000211133	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	VR21	40	M.Tech-Information Technology	2040211200	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	VR21	40	M.Tech-Information Technology	2040211201	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	VR21	40	M.Tech-Information Technology	2040211250	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.
23	VR21	40	M.Tech-Information Technology	2040211251	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	VR21	40	M.Tech-Information Technology	2040211252	Block Chain Technologies	CO1	Familiarize the functional/operational aspects of crypto currency ECOSYSTEM.
						CO2	Understand 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	Develop a course project using a Bitcoin technology.
25	VR21	40	M.Tech-Information Technology	2040211253	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	VR21	40	M.Tech-Information Technology	2040211254	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	VR21	40	M.Tech-Information Technology	2040211255	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	VR21	40	M.Tech-Information Technology	2040211256	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.
29	VR21	40	M.Tech-Information Technology	2040211257	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	VR21	40	M.Tech-Information Technology	2040211258	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	VR21	40	M.Tech-Information Technology	2040211259	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	VR21	40	M.Tech-Information Technology	2040211210	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.
33	VR21	40	M.Tech-Information Technology	2040211211	Full Stack Technologies Lab	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	VR21	40	M.Tech-Information Technology	2040211270	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	VR21	40	M.Tech-Information Technology	2000211230	Constitution of India	CO1	Discuss the growth of the demand for civil rights in India
						CO2	Discuss the intellectual origins of the framework of
						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	VR21	40	M.Tech-Information Technology	2000211231	Pedagogy Studies	CO1	What pedagogical practices are being used by teachers in
						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	VR21	40	M.Tech-Information Technology	2000211232	Stress Management by Yoga	CO1	Develop healthy mind in a healthy body thus improving
						CO2	Improve efficiency.
						CO3	Reduces Stress and Anxiety.
						CO4	Identify and apply injury prevention principles related to yoga activities.
38	VR21	40	M.Tech-Information Technology	2000211233	Personality Development through Life Enlightenemnt Skills	CO1	Study of Shrimad-Bhagwad-Geeta will help the student in
						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	VR21	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	VR21	40	M.Tech-Information Technology	2040192151	TCP/IP Protocol Suite	CO1	Summarize basic principles of IPv6 and its Addressing mechanisms.
						CO2	Understand UDP Services and Applications in Transport Layer.
						CO3	Describe the services, and features of TCP.
						CO4	Discuss various Flow, Error and Congestion control mechanisms of TCP.
41	VR21	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	VR21	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.
43	VR21	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,
						CO4	Identify real-world applications using oops, files and exception handling provided by python.
44	VR21	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	VR21	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	VR21	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	VR21	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	VR21	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	VR21	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	VR21	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
VR - 21 M.Tech - Power Industrial Drives 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	VR21	42	M.Tech-Power and Industrial Drives	2042211100	Electrical Machines 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 machines.
						CO3	Evaluate the steady state and transient behaviour of induction and synchronous machines to Propose the suitability of drives for
						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	VR21	42	M.Tech-Power and Industrial Drives	2042211101	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	VR21	42	M.Tech-Power and Industrial Drives	2042211150	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 nonlinearities using phase plane analysis
						CO4	Solve the optimal control problems for any continuous time invariant systems.
4	VR21	42	M.Tech-Power and Industrial Drives	2042211151	Hybrid Electric Vehicles	CO1	Know the concept of electric vehicles and hybrid electric vehicles.
						CO2	Familiar with different motors used for hybrid electric vehicles.
						CO3	Understand the power converters used in hybrid electric vehicles
						CO4	Know different batteries and other energy storage systems.
5	VR21	42	M.Tech-Power and Industrial Drives	2042211152	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,
						CO4	Design PID controller with PLC.
6	VR21	42	M.Tech-Power and Industrial Drives	2042211153	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
7	VR21	42	M.Tech-Power and Industrial Drives	2042211154	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.

8	VR21	42	M.Tech-Power and Industrial Drives	2042211155	Power Electronic Applications to Renewable Energy	CO1	Explain about various non conventional energy sources
						CO2	Describe different machines used in renewable energy systems and also the control of synchronous generator with converters
						CO3	Analyse different DC-DC converters
						CO4	Explain control schemes for grid connected inverters
9	VR21	42	M.Tech-Power and Industrial Drives	2042211110	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
10	VR21	42	M.Tech-Power and Industrial Drives	2042211111	Power Converters Laboratory	CO1	Determine the power factor and harmonic factor for various converters.
						CO2	Design of gate drive circuits for IGBT & MOSFET"s.
						CO3	Explain the operation of various power electronic inverters
						CO4	Implement the converter and inverters in real time applications.
11	VR21	42	M.Tech-Power and Industrial Drives	2042211200	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	VR21	42	M.Tech-Power and Industrial Drives	2042211201	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	VR21	42	M.Tech-Power and Industrial Drives	2042211250	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
14	VR21	42	M.Tech-Power and Industrial Drives	2042211251	Electric Vehicle Design and Development	CO1	Understand the different Architecture of HEV.
						CO2	Analysis of PowerFlow controlin Series and Parallel HEV Drive.
						CO3	Design of Chassis and selection of Motor.
						CO4	Design of Electric Vehicle of HEV systems
15	VR21	42	M.Tech-Power and Industrial Drives	2042211252	Special Electrical Machines Systems	CO1	Apply the knowledge of sensors used in PMSM which can be used for controllers and synchronous machines.
						CO2	Analyze the characteristics of different types of PM type brushless DC motors and the different controllers
						CO3	Classify the types of DC linear motors and apply the knowledge of controllers to propose their application in real world.
						CO4	Evaluate the steady state and transient behavior linear induction motors.

16	VR21	42	M.Tech-Power and Industrial Drives	2042211253	Advanced Digital Signal Processing	CO1	Design digital filters with different techniques and also describe structure of digital filters.
						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.
17	VR21	42	M.Tech-Power and Industrial Drives	2042211254	Applications of Power Converters	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 Bidirectional converters for charge/discharge
18	VR21	42	M.Tech-Power and Industrial Drives	2042211255	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.
19	VR21	42	M.Tech-Power and Industrial Drives	2042211210	Electric Drives Simulation Laboratory	CO1	Implement the PWM techniques in simulation for various machines.
						CO2	Analyze the performance of different electrical machines and drives.
						CO3	Examine and simulation the various types of machines.
						CO4	Evaluation the effect of switching frequency on electric drives.
20	VR21	42	M.Tech-Power and Industrial Drives	2042211211	Electric Drives Laboratory	CO1	Understand the performance of DC & AC drives.
						CO2	Analyze the performance of DC drives and AC drives.
						CO3	Examine the Speed control of PMSM drive, BLDC drive and induction motor drive.
						CO4	Explain the dynamic braking and regenerative braking of DC drive.
21	VR21	42	M.Tech-Power and Industrial Drives	2042212150	Distributed Generation and Micro Grids	CO1	To explain topologies and interconnection issues of DGs.
						CO2	To explain features of grid connected DG systems.
						CO3	To design power converter topologies for DG applications.
						CO4	To implement the control of MG and understand market issues of Microgrid.
22	VR21	42	M.Tech-Power and Industrial Drives	2042212151	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.
23	VR21	42	M.Tech-Power and Industrial Drives	2042212152	Modeling and Simulation Of Power Electronic 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.

24	VR21	42	M.Tech-Power and Industrial Drives	2042212161	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.
25	VR21	42	M.Tech-Power and Industrial Drives	2042212162	Introduction To Electric Vehicles	CO1	Explain thefundamentals of electric vehicles.
						CO2	Discuss the concept of vehicle fundamentals and hybrid electric vehicles.
						CO3	Explain the operation of different motors used for electric vehicles.
						CO4	Discuss the Indian and world electric vehiclescenarios.
26	VR21	42	M.Tech-Power and Industrial Drives	2042212163	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.

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
VR21- 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	VR21	58	M.Tech-Computer Science and Engineering	2058211100	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	VR21	58	M.Tech-Computer Science and Engineering	2058211101	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	VR21	58	M.Tech-Computer Science and Engineering	2058211110	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	VR21	58	M.Tech-Computer Science and Engineering	2058211111	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	VR21	58	M.Tech-Computer Science and Engineering	2058211150	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	VR21	58	M.Tech-Computer Science and Engineering	2058211151	Advanced Unix Programming	CO1	Make use of basic UNIX commands.
						CO2	Analyze file system architecture to organize the file system.
						CO3	Analyze shell command line structure .
						CO4	Illustrate the usage of filters in AWK language.
7	VR21	58	M.Tech-Computer Science and Engineering	2058211152	Cyber Security	CO1	Summarize the security attacks and services.
						CO2	Identify System and application security threats and vulnerabilities.
						CO3	Compare different classes of attacks.
						CO4	Apply Tools and techniques to identify Cybercrime.

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	VR21	58	M.Tech-Computer Science and Engineering	2058211153	Mobile Computing	CO1	Illustrate GSM Architecture in wireless networks.
						CO2	Select efficient Medium access control mechanism.
						CO3	Outline the functionality of a mobile agent in network layer.
						CO4	Survey of Mobile adhoc network protocols for distinguishing them from infrastructure-based networks.
9	VR21	58	M.Tech-Computer Science and Engineering	2058211154	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	VR21	58	M.Tech-Computer Science and Engineering	2058211155	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	VR21	58	M.Tech-Computer Science and Engineering	2000211100	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	VR21	58	M.Tech-Computer Science and Engineering	2000211130	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	VR21	58	M.Tech-Computer Science and Engineering	2000211130	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	VR21	58	M.Tech-Computer Science and Engineering	2000201130	Pollution Control Monitoring and Management	CO1	Understand the the effects of air, water and soil pollutions.
						CO2	Prevent the pollution control using the different control methods.
						CO3	Explain the environmental monitoring-purpose of monitoring, types of monitoring.
						CO4	Monitor and Manage the Noise pollution, Thermal pollution, Radioactive pollution.
15	VR21	58	M.Tech-Computer Science and	2000201130	Value Education	CO1	Knowledge of self-development.
						CO2	Learn the importance of Human values.
						CO3	Developing the overall personality.
16	VR21	58	M.Tech-Computer Science and Engineering	2058211200	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.

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
17	VR21	58	M.Tech-Computer Science and Engineering	2058211201	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.
18	VR21	58	M.Tech-Computer Science and Engineering	2058211210	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	VR21	58	M.Tech-Computer Science and Engineering	2058211211	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	VR21	58	M.Tech-Computer Science and Engineering	2058211250	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	VR21	58	M.Tech-Computer Science and Engineering	2058211251	Human Computer Interaction	CO1	Illustrate importance and characteristics of graphical user interface.
						CO2	Analyze human characteristics, human interaction speeds.
						CO3	Apply better screen design techniques.
						CO4	Analyze Interaction Devices.
22	VR21	58	M.Tech-Computer Science and Engineering	2058211252	Soft Computing	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	VR21	58	M.Tech-Computer Science and Engineering	2058211253	Cloud Computing	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.

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
24	VR21	58	M.Tech-Computer Science and Engineering	2058211254	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	VR21	58	M.Tech-Computer Science and Engineering	2058211255	Software Testing Methodologies	CO1	Outline the necessity of testing, debugging using program control flow.
						CO2	Apply transaction flow, data flow testing to unit and integration testing.
						CO3	Analyze white box testing methods and metrics.
						CO4	Compare state graph, transaction testing, graph matrices for optimizing Code.
26	VR21	58	M.Tech-Computer Science and Engineering	2058211270	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.
27	VR21	58	M.Tech-Computer Science and Engineering	2000211230	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	VR21	58	M.Tech-Computer Science and Engineering	2000211230	Issues and Problems Of Women In India	CO1	Understand the rights of sexual minorities and transgender -about Article 377.
						CO2	Explain the concept of engendering - Strategic Gender Needs - Practical Gender Needs – Gender Budgeting– Gender Auditing – Gender sensitive approaches to development.
						CO3	Discuss the different isuuess related to gender diffrence and problems of women in india.
29	VR21	58	M.Tech-Computer Science and Engineering	2000211230	Human Values & Professional Ethics	CO1	Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field.
						CO2	Articulate what makes a particular course of action ethically defensible.
						CO3	Assess their own ethical values and the social context of problems.
						CO4	Demonstrate knowledge of ethical values in non-classroom activities, such as service learning,internships, and field work.

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
30	VR21	58	M.Tech-Computer Science and Engineering	2000211230	Personality Development through Life Enlightenment 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 Study of Neetishatakam will help in developing versatile personality of students.
31	VR21	58	M.Tech-Computer Science and Engineering	2058212150	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	VR21	58	M.Tech-Computer Science and Engineering	2058212151	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	VR21	58	M.Tech-Computer Science and Engineering	2058212152	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	VR21	58	M.Tech-Computer Science and Engineering	2058212160	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	VR21	58	M.Tech-Computer Science and Engineering	2058212170	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	VR21	58	M.Tech-Computer Science and Engineering	2058212270	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

VR 21 M. Tech - Electronics and Communication Engineering Course Outcomes

S.NO	Regulation	Program Code	Program Name	Course Code	Course Name	COs	Course Outcomes (COs)
1	VR21	70	M.Tech. Electronics and Communication Engineering	2070211100	Digital System Design using VHDL	CO1	Understand Basics of VHDL Programming.
						CO2	Use VHDL simulate and validate the circuit design.
						CO3	Design and analyze combinational circuits using VHDL .
						CO4	Design and analyze sequential circuits using VHDL.
2	VR21	70	M.Tech. Electronics and Communication Engineering	2070211101	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211150	Transform Techniques	CO1	learn basics of two-dimensional transforms.
						CO2	Understand the definition, properties and applications of various two-dimensional transform.
						CO3	Under stand the basic concepts of wavelet transform.
						CO4	Understand the special topics such as wavelet packets,Bi-orthogonal wavelets e.t.c.
4	VR21	70	M.Tech. Electronics and Communication Engineering	2070211151	VLSI Technology and Design	CO1	Review of FET fundamentals for VLSI design.
						CO2	To acquires knowledge about stick diagrams and layouts.
						CO3	Enable to design the subsystems based on VLSI concepts.
						CO4	Analyse the floor planning methods.
5	VR21	70	M.Tech. Electronics and Communication Engineering	2070211152	Radar Signal Processing	CO1	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211153	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211154	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211155	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211110	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211111	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	VR21	70	M.Tech. Electronics and Communication Engineering	2000211100	Research Methodology and IPR	CO1	Understand research problem formulation and analyze research related information Follow research ethics.
						CO2	Understand that today"s world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
						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.PropertyRighttobepromotedamongstudentsingeneral & engineeringinparticular.
						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. andsocialbenefits.
12	VR21	70	M.Tech. Electronics and Communication Engineering	2000211130	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211200	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211201	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211250	Digital Controllers	CO1	Explain the architecture of 8086 microprocessors.
						CO2	Explain the instruction set architecture of microprocessor and microcontrollers.
						CO3	Write /create programming for the microprocessor and microcontrollers using assembly language.
						CO4	Design interface between I/O devices and microcontrollers.

16	VR21	70	M.Tech. Electronics and Communication Engineering	2070211251	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211252	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211253	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	VR21	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211255	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211256	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211210	Advanced Communications Lab	CO1	Identify the different types of network devices and their functions within a network.
						CO2	Understand and build the skills of sub-netting and routing mechanisms.
						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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211211	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070211270	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	VR21	70	M.Tech. Electronics and Communication Engineering	2000211230	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070212150	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070212151	Advanced Digital Signal Processing	CO1	Understand theory of different filters and algorithms.
						CO2	Understand theory of multirate DSP, solve numerical problems and write algorithms.
						CO3	Understand theory of prediction and solution of normal equations.
						CO4	Estimate the Parametric Methods of Power Spectrum
28	VR21	70	M.Tech. Electronics and Communication Engineering	2070212152	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	VR21	70	M.Tech. Electronics and Communication Engineering	2070212160	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.
30	VR21	70	M.Tech. Electronics and Communication Engineering	2070212170	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.
31	VR21	70	M.Tech. Electronics and Communication Engineering	2070212270	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
VR21 - Master of Business Administration 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	VR21	1 E-00	MBA-Master of Business Administration	3099211100	Management Theory and Organizational Behaviour	CO1	Extract Managerial skills of the students.
						CO2	Evaluate how an organization's leaders/managers utilize job design, positional power, and goal setting/performance management to motivate employees.
						CO3	Discussfundamentals of organizational behaviour by getting acquainted to the concepts related to individual and interpersonal processes3.
						CO4	Analyze the human behaviour in sociological and psychological perspectives
2	VR21	1 E-00	MBA-Master of Business Administration	3099211101	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	VR21	1 E-00	MBA-Master of Business Administration	3099211102	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	VR21	1 E-00	MBA-Master of Business Administration	3099211103	Business Communication and Soft Skills	CO1	Discuss communication theories.
						CO2	Display Verbal and Non-Verbal Communication
						CO3	Develop Presentation Skills
						CO4	Design Business Report.
5	VR21	1 E-00	MBA-Master of Business Administration	3099211104	Business Environment and Legal Aspects	CO1	Interpret business environment and its impact.
						CO2	Discuss the comprehensive structure of Indian economy.
						CO3	Debate on business law and legal aspects in business.
						CO4	Analyze the various acts of business laws.
6	VR21	1 E-00	MBA-Master of Business Administration	3099211105	Operations Research for Business	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	VR21	1 E-00	MBA-Master of Business Administration	3099211110	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	VR21	1 E-00	MBA-Master of Business Administration	3099211180	Communication SKILLS - I	CO1	Distinguish among various levels of communication and communication barriers while developing and understanding of Communication as a process
						CO2	Students will enhance their reading, speaking, listening and presentation skills.
						CO3	To demonstrate his verbal and nonverbal communication ability through presentation.
						CO4	Understand the importance of cultural differences in communication.

9	VR21	1 E-00	MBA-Master of Business Administration	3099211120	Sports/Games-I	CO1	Students will be physically fit.
						CO2	Make students mentally healthy.
						CO3	To bring up their IQ levels theough games.
						CO4	To enhance team spirit and leadership qualities.
10	VR21	1 E-00	MBA-Master of Business Administration	3099211121	Life Skills – II	CO1	Yogasanas are unique postures that enhance their flexibility,
						CO2	Yoga helps with self-esteem, self-expression, self confidence and weight loss
						CO3	Yoga helps to develop control and awareness of their breathing. Breath awareness and the ability to calm down and meditate are important skills that can use for their whole lives.
						CO4	Yoga helps prevent sports injuries. By improving strength and overall flexibility, yoga can help young athletes prevent injury to growing bones and muscles.
11	VR21	1 E-00	MBA-Master of Business Administration	3099211200	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.
12	VR21	1 E-00	MBA-Master of Business Administration	3099211201	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.
13	VR21	1 E-00	MBA-Master of Business Administration	3099211202	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.
14	VR21	1 E-00	MBA-Master of Business Administration	3099211203	Production and Operations Management	CO1	dentify 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.
15	VR21	1 E-00	MBA-Master of Business Administration	3099211204	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.
16	VR21	1 E-00	MBA-Master of Business Administration	3099211205	Project Management	CO1	Determine the Concepts of Project management at the individual, team and organizational level and also understand the Team-building skills.
						CO2	Apply project management techniques to formulate strategies .
						CO3	Develop a technical and legal feasibility for the project.
						CO4	Formulate prerequisites for successful project implementation.
17	VR21	1 E-00	MBA-Master of Business Administration	3099211280	Problem Solving Skills – II	CO1	Make use of concepts of problem solving skill.
						CO2	Apply the different types of charts and diagrams for problem solving .
						CO3	utilize the required skills needed for decision making .
						CO4	Implement different methods to societal problems.
18	VR21	1 E-00	MBA-Master of Business Administration	3099211220	Sports/Games-II	CO1	Students will be physically fit.
						CO2	Make students mentally healthy.
						CO3	To bring up their IQ levels theough games.
						CO4	To enhance team spirit and leadership qualities.

19	VR21	1 E-00	MBA-Master of Business Administration	3099211221	Life Skills – II	CO1	Apply positive attitude and ethics in work place .
						CO2	Assess oneslef using SWOT analysis and Johari window.
						CO3	Implement nutrition and dietics in daily routine.
						CO4	Adapt to presentation skills,interview skills require for public speaking.
20	VR21	1 E-00	MBA-Master of Business Administration	3099212100	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.
21	VR21	1 E-00	MBA-Master of Business Administration	3099212101	Business Ethics and 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.
22	VR21	1 E-00	MBA-Master of Business Administration	3099212130	Performance Evaluation and Compementation	CO1	Determine effectiveness of performance management in an organization.
						CO2	Analyze concept of performance appraisal for reward and recognition.
						CO3	Determine concepts of compensation and designing of effective compensation system.
						CO4	Interpret Wage and Salary Administration.
23	VR21	1 E-00	MBA-Master of Business Administration	3099212131	Employee Relations and Engagement	CO1	Apply different laws related to Employee relation in India.
						CO2	Interpret the concept of trade union and aware of its disputes solving mechanisms.
						CO3	Apply the emerging trendsin employee relations.
						CO4	Implement various IR legislations for the wellbeing of employees.
24	VR21	1 E-00	MBA-Master of Business Administration	3099212132	Human Capital Management	CO1	Develop business and management competencies among the future managers.
						CO2	Ability to examine and analyze the impact of Human Capital Management Initiatives.
						CO3	Facilitating deeper insights, stimulation towards creative thinking, honing of management skills.
						CO4	Analyze and apply international HCM concepts in relation to g ethical issues at the work place.
	VR21	1 E-00	MBA-Master of Business Administration	3099212133	Investment Analysis and Portfolio Management	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.
26	VR21	1 E-00	MBA-Master of Business Administration	3099212134	Banking and Insurance	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.
27	VR21	1 E-00	MBA-Master of Business Administration	3099212135	Mergers, Acquisitions and Corporate Restructuring	CO1	Identify basic concepts of Mergers & Acquisitions
						CO2	Discuss the various strategic perspectives of Mergers & Acquisitions.
						CO3	Analyze the dynamics of Mergers & Acquisitions process.
						CO4	Debate on methods of Mergers & Acquisitions and corporate restructuring.
28	VR21	1 E-00	MBA-Master of Business Administration	3099212136	Retail Management	CO1	Differentiate the concept of retail management and retail marketing environment.
						CO2	Develop retail formats basing upon the social and environmental concerns.
						CO3	Debate on Marketing Communication to Integrate marketing process to achieve organizational goals.
						CO4	Analyze Competitive Advantage in the markets.

29	VR21	1 E-00	MBA-Master of Business Administration	3099212137	Digital and Social Media Marketing	CO1	Identify the marketing potential of digital technologies in real-life challenges.
						CO2	Interpret various digital and social media platforms.
						CO3	Formulate the digital tactics to achieve marketing goals in the organization.
						CO4	Analyze the digital consumer by using Social Media Marketing.
30	VR21	1 E-00	MBA-Master of Business Administration	3099212138	Customer Relationship Management	CO1	Apply the concept of CRM, the benefits delivered by CRM.
						CO2	Interpret how CRM practices and strategies enhance the achievement of marketing objectives.
						CO3	Implement various technological tools for data mining and also successful implementation of CRM in the Organizations.
						CO4	Design customer relationship management strategies by understanding customers' preferences.
31	VR21	1 E-00	MBA-Master of Business Administration	3099212139	Essential of Business Analytics	CO1	Demonstrate the basic concepts of Business Analytics.
						CO2	Discuss the various Methods to formulate and solve business problems.
						CO3	Analyze Business data using different statistical methods.
						CO4	Develop the reports using different visualizations tools for Business decision making.
32	VR21	1 E-00	MBA-Master of Business Administration	3099212140	Big Data Analytics	CO1	Critically understand the building blocks of Big Data.
						CO2	Demonstrate the specialized aspects of big data with the help of different big data applications.
						CO3	Apply the analytical aspects of Big Data .
						CO4	Discuss the recent research trends related to Hadoop File System.
33	VR21	1 E-00	MBA-Master of Business Administration	3099212141	Marketing Analytic	CO1	Critically discuss fundamentals of Market analysis.
						CO2	Formulate Competitive Analysis And Business Strategy in decision making.
						CO3	Analyze Product, Service and Price Analytics.
						CO4	Measure promotional and E-commerce performances using analytics.
34	VR21	1 E-00	MBA-Master of Business Administration	3099212142	Store keeping and Warehousing Management	CO1	Identify procurement system, selection of supplier and warehouse management.
						CO2	Apply the concepts to design a store management system.
						CO3	Develop an efficient warehouse management system for materials handling.
						CO4	Design and implement effective inventory control device and warehouse layout for safety handling.
35	VR21	1 E-00	MBA-Master of Business Administration	3099212143	Transportation and Infrastructure Management for SCM	CO1	Identify transportation functionality its principles and supply chain management systems.
						CO2	Apply the concepts to packaging models for overseas shipment of materials with proper standards.
						CO3	Develop an efficient plan for sourcing and transportation network in supply chain and models.
						CO4	Design and implement distribution network for sourcing materials.
36	VR21	1 E-00	MBA-Master of Business Administration	3099212144	Purchasing and Material Management	CO1	Inculcate domain knowledge on management roles and responsibilities of purchasing Management.
						CO2	Identify knowledge on various Materials Handing and Transportation Management.
						CO3	Apply various methods of inventory techniques.
						CO4	Analyze various lending institutes.
37	VR21	1 E-00	MBA-Master of Business Administration	3099212145	Hospital Organization and Management	CO1	Identify the role of a professional manager in a Hospital.
						CO2	Analyze the managerial function in a hospital.
						CO3	Apply behavioral concepts and theories.
						CO4	Determine the organization structure and organizational climate.

38	VR21	1 E-00	MBA-Master of Business Administration	3099212146	Dealth Care Policies and Delivery System	CO1	Discuss the importance of healthcare policy-making as it relates to the healthcare delivery system.
						CO2	Describe the different types of organizations, services, and personnel and their relationships across the healthcare delivery system.
						CO3	Identify policies, regulations, and standards that effect healthcare operations and health information exchange.
						CO4	Identify potential risks to quality patient care and to the organization.
39	VR21	1 E-00	MBA-Master of Business Administration	3099212147	Dospital Functions and Support Services	CO1	Determine Nutrition and Dietary services.
						CO2	Examine the functioning in a hospital.
						CO3	Identify various types of services in hospital.
						CO4	Implement disaster management.
40	VR21	1 E-00	MBA-Master of Business Administration	3099212148	Travel Agency and Tour Operations	CO1	Execute the knowledge and skills of tourism operations in the industry.
						CO2	Linking legal aspects in tour and travel operations.
						CO3	Apply the function and execute the planning and development.
						CO4	Implement the concepts and components of tourism and travel.
41	VR21	1 E-00	MBA-Master of Business Administration	3099212149	Hospitality Management	CO1	Identify and apply business concepts and skills relevant to the operational areas of hospitality management.
						CO2	Get familiarize with Hotel and resort management.
						CO3	Interpret the importance of various departments and its role in the Hospitality Industry.
						CO4	Able to measure the performance of the hotel services.
42	VR21	1 E-00	MBA-Master of Business Administration	3099212150	Tourism Policy and Planning	CO1	Discuss how the tourism policy and principles impact tourism development in different scales.
						CO2	Apply the principles of tourism formulation and implement to the practices of tourism planning.
						CO3	Execute the theory of tourism planning into special tourism cases and issues.
						CO4	Assess the tourism sustainable development referring to the tourism impacts.
43	VR21	1 E-00	MBA-Master of Business Administration	3099212149	Hospitality Management	CO1	Identify and apply business concepts and skills relevant to the operational areas of hospitality management.
						CO2	Get familiarize with Hotel and resort management.
						CO3	Interpret the importance of various departments and its role in the Hospitality Industry.
						CO4	Able to measure the performance of the hotel services.
44	VR21	1 E-00	MBA-Master of Business Administration	3099212160	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.
45	VR21	1 E-00	MBA-Master of Business Administration	3099212180	Self-Management Skills	CO1	Understand the concepts of Self-Management skills.
						CO2	Apply the different type of Self-Management skills for management of the Business environment.
						CO3	Understand the required Self-Management skills needed for the better improvement individual development and to face competition.
						CO4	Understand the basic skills to perform and to control in all business activities.
46	VR21	1 E-00	MBA-Master of Business Administration	3099212161	Internship	CO1	Conduct field survey on society / corporate / business / government / NGO.
						CO2	Learn practical concepts in industries.
						CO3	Make observations and give recommendations.
						CO4	Prepare and present the report.

47	VR21	1 E-00	MBA-Master of Business Administration	3099212120	Sports/Games-III	CO1	Students will be physically fit.
						CO2	Make students mentally healthy.
						CO3	Bring up their IQ levels theough games.
						CO4	Enhance team spirit and leadership qualities.
48	VR21	1 E-00	MBA-Master of Business Administration	3099212121	Women Rights in India	CO1	Interpret the role of women in the development of the society and the rights given by the constitution of India.
						CO2	Identify the acts and laws related to women's in family and marriages.
						CO3	Elucidate political rights of women in India and their reservations.
						CO4	Apply the laws related to women's protection at work and violence.
49	VR21	1 E-00	MBA-Master of Business Administration	3099212200	Supply Chain Management and Analytics	CO1	Apply analytics in supply chain management to achieve competitive advantage.
						CO2	Develop data driven decision making by applying supply chain analytics for enhancing supply chain performance.
						CO3	Formulate scheduling algorithms and linking algorithms to resolve business problems.
						CO4	Interpret the role of computer/ IT in supply chain management by being adoptive to continuous learning.
50	VR21	1 E-00	MBA-Master of Business Administration	3099212201	Innovation and Entrepreneurship	CO1	Identify barriers to Entrepreneurship development.
						CO2	Develop Ideas and analyze functional feasibility.
						CO3	Evaluate Operational problems.
						CO4	Debate on Sickness and Rights.
51	VR21	1 E-00	MBA-Master of Business Administration	3099212230	Global Human Resource Management	CO1	Demonstrate across a broad knowledge of GHRM strategies, Policies and practices across a range of cultural and nations.
						CO2	Identify the differences between the intentional and domestic dimension of the operational aspects of GHRM.
						CO3	Demonstrate the management of expatriate employees and the problems confront to expatriate management.
						CO4	Analyze and apply international HRM concepts in relation to global ethical issues in the work place.
	VR21	1 E-00	MBA-Master of Business Administration	3099212231	Labour Welfare and Employment Laws	CO1	Apply the concepts of labour welfare and law.
						CO2	Apply knowledge of the structure of the legal system to understand the validity of various types of legal pronouncements, rulings and regulations.
						CO3	Develop administrative process and the role it plays in resolving disputes that frequently arise in employment settings.
						CO4	Interpret wages and salary administration.
53	VR21	1 E-00	MBA-Master of Business Administration	3099212232	Human Resource Development	CO1	Develop the understanding of the concept of human resource development and to understand its relevance in organizations.
						CO2	Develop necessary skill set for application of various HRD issues.
						CO3	Analyse the strategic issues and strategies required toselect and develop manpower resources.
						CO4	Integrate the knowledge of HRD concepts to take correct business decisions
54	VR21	1 E-00	MBA-Master of Business Administration	3099212233	International Financial Management	CO1	Demonstrate the concepts of international financial environment.
						CO2	Illustrate applications foreign exchange exposure.
						CO3	Develop a frame to solve problems pertaining to international financial management.
						CO4	Critically analyze international financing.

55	VR21	1 E-00	MBA-Master of Business Administration	3099212234	Financial Risk Management	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.
56	VR21	1 E-00	MBA-Master of Business Administration	3099212235	Behavioural Finance	CO1	Critically discuss the fundamentals of behavioral finance.
						CO2	Apply alternative models of investment decision making.
						CO3	Analyze various factors impacting the markets.
						CO4	Measure the risk factors related to emotions.
57	VR21	1 E-00	MBA-Master of Business Administration	3099212236	Advertising and Brand Management	CO1	Interpret major advertising platforms.
						CO2	Build brands from an organizational goals perspective.
						CO3	Measure brand health in new ways, both internally and externally.
						CO4	Develop the role of advertisingin the current Marketing Environment.
58	VR21	1 E-00	MBA-Master of Business Administration	3099212237	Green Marketing	CO1	Apply knowledge of Green Marketing for designing green products.
						CO2	Analyze Green Marketing concepts.
						CO3	Make use of Green marketing concepts to environmental concerns.
						CO4	Formulate Green marketing initiatives.
59	VR21	1 E-00	MBA-Master of Business Administration	3099212238	Global Marketing Management	CO1	Apply basic international marketing theories and concepts to understand the environment.
						CO2	Interpret international environment in order to develop appropriate international marketing strategies.
						CO3	Develop unique international marketing plans.
						CO4	Design and implement effective market access strategies.
60	VR21	1 E-00	MBA-Master of Business Administration	3099212239	Financial Analytics	CO1	Discuss the concepts and practices of financial analytics.
						CO2	Analyze Bond and Stock investments.
						CO3	Apply various analytical techniques.
						CO4	Demonstrate prediction models in finance.
61	VR21	1 E-00	MBA-Master of Business Administration	3099212240	HR Analytics	CO1	Discuss HR perspectives.
						CO2	Analyze the Fundamentals of HR Analytics.
						CO3	Discuss HR analytics Frameworks.
						CO4	Apply the concepts of HR metrics and HR scorecard using different analytical methods.
62	VR21	1 E-00	MBA-Master of Business Administration	3099212241	Econometrics and Business Forecasting	CO1	Discuss key concepts in time series econometrics and acquire basic analytical skills in time series analysis.
						CO2	Provide a proper understanding of articles in empirical macroeconomics and finance using the core techniques of time series econometrics.
						CO3	Select an appropriate regression model and use Gretl to analyze a given time-series economic data set, and then conduct forecasting and statistical inference and interpret the results.
						CO4	Collect their own data set to conduct empirical analysis, and provide answers to economic questions.
63	VR21	1 E-00	MBA-Master of Business Administration	3099212242	Enterprise Resource Planning	CO1	Make basic use of Enterprise software, and its role in integrating business functions.
						CO2	Analyze the strategic options for ERP identification and adoption.
						CO3	Design the ERP implementation strategies.
						CO4	Create reengineered business processes for successful ERP implementation.

64	VR21	1 E-00	MBA-Master of Business Administration	3099212243	Lean Supply Chain Management	CO1	To determine issues & challenges in implementing & developing lean manufacturing techniques for improving organizational performance.
						CO2	Analyze how lean techniques can be applied to manufacturing & service industry.
						CO3	Developing lean management strategy for Supply chain management.
						CO4	Analyzing how lean technique can create value generation for organization.
65	VR21	1 E-00	MBA-Master of Business Administration	3099212244	Green Supply Chain Management	CO1	Develop the understanding of green and sustainable supply chain practices.
						CO2	Learn tools and techniques required to analyze and design environmentally sustainable supply chain systems.
						CO3	Critically assess strategic choices related to Green SCM design.
						CO4	Develop variety of environmental accounting methods effectively.
66	VR21	1 E-00	MBA-Master of Business Administration	3099212245	Patient Care and Service Management	CO1	Implement Patient centric management.
						CO2	Determine the Quality in patient care management.
						CO3	Interpret Patient classification systems and the role of case mix.
						CO4	Apply Medical ethics and Disaster preparedness.
67	VR21	1 E-00	MBA-Master of Business Administration	3099212246	Managed Health Care and Insurance	CO1	Meet the needs of students who want to pursue career in Health Care sector.
						CO2	Analyze various health insurance policies and suggest best one as per requirements.
						CO3	Handle health insurance schemes like CGHS and ESI.
						CO4	Standardize and manage Health insurance Taxation for Hospitals.
68	VR21	1 E-00	MBA-Master of Business Administration	3099212247	Hospital Management and Information Management	CO1	Critically discuss the evolution of information technology
						CO2	Summarize various factors impacting the Automating the paper record.
						CO3	Analyse Electronic Communications process of health care.
						CO4	Measure the Barriers to Information Technology implementation.
69	VR21	1 E-00	MBA-Master of Business Administration	3099212248	Event Management	CO1	Aware about the theoretical knowledge of event management and manage different types of events.
						CO2	Discuss the practical aspects of functions of events in a realistic manner.
						CO3	Spot various opportunities in event business and apply knowledge and skill in it.
						CO4	Analysis of logistical requirements for an event and negotiate with vendors.
70	VR21	1 E-00	MBA-Master of Business Administration	3099212249	Front Office Management	CO1	Critically examine basic concepts of Front office Management.
						CO2	Demonstrate front office layout and operations.
						CO3	Elucidate Sources and modes of reservations and Hotel Reservation Systems.
						CO4	Elucidate basic concepts of Front office Management.
71	VR21	1 E-00	MBA-Master of Business Administration	3099212250	Information Technology and Tourism	CO1	Exmaine the relevant, discipline based knowledge, skills & values and be able to apply and evaluate knowledge.
						CO2	Determine the self-aware, independent learners & able to collect, organize, analyze, evaluate and use information in a range of contexts.
						CO3	Able to communicate to speak, listen andwrite competently and to competent users of informationand communication technologies.
						CO4	Initiate constructive & creative and to be enterprising.

72	VR21	`	MBA-Master of Business Administration	3099212260	Major 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.
73	VR21	1 E-00	MBA-Master of Business Administration	3099212280	Leadership Skills	CO1	Evaluate the concepts of employability skills and responsibilities.
						CO2	Apply the different type of skills for management the Business environment.
						CO3	Interpret the required skills needed for the better improvement individual development and to face competition.
						CO4	Apply the basic skills to perform and to lead in all business activities.
74	VR21	1 E-00	MBA-Master of Business Administration	3099212270	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.
75	VR21	1 E-00	MBA-Master of Business Administration	3099212221	Universal Human Values	CO1	Evaluate the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society.
						CO2	Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
						CO3	Identify the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society.
						CO4	Elucidate the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.