VR19

COURSE OUTCOMES

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

VR19 - COURSE OUTCOMES

S.NO	COURSE CODE	Course Name		Course Outcomes (COs):Upon completion of the course student will be able to
1	2070191100	Digital System Design	C101.1	Understand the basic concepts of a Karnaugh Map ("K-map") for a 2-, 3-, 4-, or 5-
			C101.2	Perform the minimization of PLA using IISc algorithm and folding using
			C101.3	Design a digital circuit by steps involving ASM chart and understand the digital
			C101.4	Rectify a single fault and multiple faults in combinational circuits using Path
2	2070191101	Digital Data Communication	C102.1	Model digital communication system using appropriate mathematical techniques
			C102.2	Understanding the basic concepts of how digital data is transferred across
			C102.3	Understand and explain Data Communications System and its components and
			C102.4	Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of
3	2070191150	Transform Techniques	C103.1	learn basics of two-dimensional transforms.
			C103.2	Understand the definition, properties and applications of various two-dimensional
			C103.3	Understandthebasicconceptsofwavelettransform.
			C103.4	Understandthespecialtopicssuchaswaveletpackets,Bi-orthogonalwaveletse.t.c.
4	2070191151	VLSI Technology and Design	C104.1	ReviewofFET fundamentalsforVLSIdesign.
			C104.2	Toacquiresknowledgeaboutstickdiagramsandlayouts.
			C104.3	Enabletodesignthesubsystemsbasedon VLSIconcepts
			C104.4	Analyse the floor planning methods
5	2070191152	Radar Signal Processing	C105.1	UnderstandtheoperationofRadarandcharacteristicsofMatchedfilter fornon-
6	2070191153	Statistical Signal Processing	C106.1	Generalize the properties of statistical models in the analysis of signals using Stochastic processes.
			C106.2	Differentiate the prominence of various spectral estimation techniques for
			C106.3	Outline various parametric estimation methods to accomplish the signal modeling
			C106.4	Design and development of optimum filters using classical and adaptive
7	2070191154	Optical Communication Technology	C107.1	Abletoanalyzecharacteristicsofopticalfiber
			C107.2	Know the commonly used components and subsystems in optical communication and network systems ,Working principle of optical communication components
			C107.3	Analyze Transmission system model
			C107.4	Understand the importance of wavelength division multiplexing (WDM) and de-
8	2070191155	Network Security & Cryptography	C108.1	Identify and utilize different forms of cryptography techniques.
			C108.2	Incorporate authentication and security in the network applications.
			C108.3	Distinguish among different types of threats to the system and handle the same.
			C108.4	Analyze and design hash and MAC algorithms, and digital signatures.
9	2070191110	System Design Using VHDL Lab	C119.1	Identify, formulate, solve and implement problems in signal processing,
			C119.2	Use EDA tools like Cadence, Mentor Graphics and Xilinx.
			C119.3	Design different digital circuits and simulate using Xilinx
			C119.4	Apply verilog programming tools to implement different applications.
10	2070191111	Data Communications Lab	C110.1	Understand the basics of data communication, networking, internet and their
			C110.2	Analyze the services and features of various protocol layers in data networks.
			C110.3	Differentiate wired and wireless computer networks
			C110.4	Analyse TCP/IP and their protocols.
11	2000191100	Research Methodology and IPR	C111.1	Understandresearchproblemformulation and analyzeresearch
			C111.2	Understand that today"s world is controlled by Computer, Information
			C111.3	UnderstandingthatwhenIPRwouldtakesuchimportantplaceingrowthofindividuals& nation, it is needless to emphasis the need of information about Intellectual
			C111.4	Understand that IPR protection provides an incentive to inventors for further researchworkandinvestmentinR&D,whichleadstocreationofnewandbetterproducts,a
12	2000191130	Soft Skills (Audit course 1)	C112.1	prepare project title.
			C112.2	prepare a project report.
			C112.3	Identify gaps in literature.
			C112.4	Improve writing and presentation skills of the project .
13	2070191200	Image and video processing	C112.1	Know digital image, representation of digital image, importance of image resolution, applications in image processing, the advantages of representation of
			C112.2	Understand and analyze the image enhancement and image degradation, image
			C112.3	Understand and analyze the detection of point, line and edges in images, edge linking and various segmentation techniques and the redundancy in images,
			C112.4	Describe the video technology from analog color TV systems to digital video systems, how video signal is sampled and filtering operations in video processing
14	2070191201	Wireless Communications and Networks	C114.1	UnderstandCellularcommunicationconcepts
			C114.2	Studythemobileradiopropagation
			C114.3	Studythewireless networkdifferent typeof MAC protocols
			C114.4	Determine the type and appropriate model of wireless fading channel based on the

15	2070191250	CMOS Analog & Digital IC Design	C115.1	Analyze, design, optimize and simulate analog and digital circuits using CMOS
			C115.2	Connect the individual gates to form the building blocks of asystem.
			C115.3	Use EDA tools like Cadence, Mentor Graphics and other open source software
			C115.4	Design Analog and digital circuits using CMOS
16	2070191251	Advanced Computer Architecture	C116.1	Understand parallelism and pipelining concepts, the design aspects and challenges
			C116.2	Evaluate the issues in vector and array processors.
			C116.3	Study and analyze the high performance scalable multithreaded and multiprocessor
			C116.4	Interpret the different architecture models
17	2070191252	Soft Computing Techniques	C117.1	Understand the basic concepts of Artificial neural network systems as well as understand the McCulloch-Pitts neuron model, simple and multilayer Perception,
			C117.2	Data processing, Hopfield and self-organizing network and difference between crisp sets to fuzzy sets, fuzzy models, fuzzification, inference, membership
			C117.3	Understand the concept of Genetic Algorithm steps. Tabu, anD-colony search
			C117.4	GA applications to power system optimization problems, identification and control of linear and nonlinear dynamic systems using MATLAB-Neural network toolbox
18	2070191253	Cyber Security	C118.1	Analyze and evaluate the cyber security needs of an organization.
			C118.2	Conduct a cyber security risk assessment.
			C118.3	Measure the performance and troubleshoot cyber security systems.
			C118.4	Implement cyber security solutions.
19	2070191254	DSP Processors and Architectures	C119.1	Understand the basics concepts of Digital Signal Processing (DSP) and transforms.
			C119.2	Distinguish between the architectural features of General purpose processors and
			C119.3	Understand the architectures of TMS320C54xx devices.
			C119.4	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
20	2070191255	EMI/EMC	C119.1	Understand the electromagnetic environment the definitions of EMI and EMC, history of EMI some examples of practical experiences due to EMI such
			C119.2	Understand the celestial electromagnetic noise the occurrence of lightning discharge and their effects, the charge accumulation and
			C119.3	Understand the methods to measure RE and RS in the open are test sites
			C119.4	Understand the measurement facilities and procedures using anechoic
21	2070191256	Object Oriented Programming	C119.1	The model of object oriented programming: abstract data types, encapsulation,
			C119.2	Fundamental features of an object oriented language like Java: object classes and
			C119.3	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
			C119.4	How to test, document and prepare a professional looking package for each
		Advanced Communications Lab	C119.1	Identify the different types of network devices and their functions within anetwork.
			C119.2	Understand and build the skills of sub-netting and routingmechanisms.
			C119.3	Understand basic protocols of computer networks, and how they can be used to
			C119.4	Implement the digital filters using DSP Trainer kit
23	2070191211	Advanced Image Processing Lab	C119.1	Perform and analyze image and video enhancement and restoration
			C119.2	Perform and analyze image and video segmentation and compression
			C119.3	work and process viz., detection, extraction on the image/video
			C119.4	Extract the information from the image using boundary and regional features.
24	2070191270	Mini Project(Seminar)	C119.1	Identify, discuss and justify the technical aspects of the chosen project with a
			C119.2	Reproduce, improve and refine technical aspects for engineering projects.
			C119.3	Work as an individual or in a team in development of technical projects.
			C119.4	Communicate and report effectively project related activities and findings.
25	2000191230	Constitution of India (Audit course)	C119.1	Have general knowledge and legal literacy and thereby to take up competitive
			C119.2	Understand state and central policies, fundamental duties.
			C119.3	Understand Electoral Process, special provisions.
			C119.4	Understand powers and functions of Municipalities, Panchayats and Cooperative
26	2070192150	Detection & Estimation Theory	C119.1	Understand the mathematical background of signal detection an destination
			C119.2	Use classical and Bayesian approaches to formulate and solve problems for signal
			C119.3	Derive and apply filtering methods for parameter estimation.
			C119.4	Estimate the Parameters of Random Processes from Data
27	2070192151	Advanced Digital Signal Processing	C119.1	Understand theory of different filters andalgorithms
			C119.2	Understand theory of multirate DSP, solve numerical problems and
			C119.3	Understand theory of prediction and solution of normalequations
			C119.4	Estimate the Parametric Methods of Power Spectrum
28	2070192152	Coding Theory and Applications	C119.1	Learning the measurement of information and errors.
			C119.2	Obtain knowledge in designing Linear Block Codes and Cyclic codes.
			C119.3	Construct tree and trellies diagrams for convolution codes
			C119.4	Design the Turbo codes and Space time codes and also their applications
29	2070192160	MOOCs 2	C119.1	Connect openly on a global scale, with global learners and Instructors
			C119.2	Develop high quality learning using multimedia platform

29	2070192100	MOOCs-2	C119.3	Self assesment of their performance and learning process.
			C119.4	Adapt a life long learning culture and updating the knowledge according with emerging
33	2070192170	Dissertation Phase -I	C119.1	Apply knowledge of Electronics and communication engineering fundamentals to solve
			C119.2	Design prototypes and solutions to solve the specific needs related with public health, safety, society and environment leading to sustainable development following ethical
			C119.3	Adapt appropriate techniques, resources and modern engineering tools during the
			C119.4	Develop a multidisciplinary project leading to the ability of engagement in lifelong
34	2070192270	Dissertation Phase -II	C119.1	Apply knowledge of Electronics and communication engineering fundamentals to solve
			C119.2	Design prototypes and solutions to solve the specific needs related with public health, safety, society and environment leading to sustainable development following ethical
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2	2038191101	Digital Data Communication	CO1	Model digital communication system using appropriate mathematical techniques (error
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3	2038191150	Transform Techniques	CO1	learn basics of two-dimensional transforms.
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			CO4	Knowthesignificanceandtypes ofpulsecompression techniquesforanalogand digitalsignals
6	2038191153	Statistical Signal Processing	CO1	Generalize the properties of statistical models in the analysis of signals using Stochastic
			CO2	Differentiate the prominence of various spectral estimation techniques for Achieving
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7	2038191154	Optical Communication Technology	CO1	Abletoanalyzecharacteristicsofopticalfiber andsignalpropagationthroughopticalfibers
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			CO2	Understand the celestial electromagnetic noise the occurrence of lightning discharge and their effects, the charge accumulation and discharge in an
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			CO4	Understand the measurement facilities and procedures using anechoic
21	2038191256	Object Oriented Programming	CO1	The model of object oriented programming: abstract data types, encapsulation, inheritance
			CO2	Fundamental features of an object oriented language like Java: object classes and
			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
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		Advanced Communications Lab	CO1	Identify the different types of network devices and their functions within anetwork.
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			CO3	Understand basic protocols of computer networks, and how they can be used to assist in
			CO4	Implement the digital filters using DSP Trainer kit
23	2038191211	Advanced Image Processing Lab	CO1	Perform and analyze image and video enhancement and restoration
			CO2	Perform and analyze image and video segmentation and compression
			CO3	work and process viz., detection, extraction on the image/video
			CO4	Extract the information from the image using boundary and regional features.
24	2038191238	Mini Project(Seminar)	CO1	Identify, discuss and justify the technical aspects of the chosen project with a
			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	2000191230	Constitution of India (Audit course)	CO1	Have general knowledge and legal literacy and thereby to take up competitive
			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	2038192150	Detection & Estimation Theory	CO1	Understand the mathematical background of signal detection an destination
			CO2	Use classical and Bayesian approaches to formulate and solve problems for signal detection
			CO3	Derive and apply filtering methods for parameter estimation.
			CO4	Estimate the Parameters of Random Processes from Data
27	2038192151	Advanced Digital Signal Processing	CO1	Understand theory of different filters andalgorithms
			CO2	Understand theory of multirate DSP, solve numerical problems and writealgorithms
			CO3	Understand theory of prediction and solution of normalequations
			CO4	Estimate the Parametric Methods of Power Spectrum
28	2038192152	Coding Theory and Applications	CO1	Learning the measurement of information and errors.
			CO2	Obtain knowledge in designing Linear Block Codes and Cyclic codes.
			CO3	Construct tree and trellies diagrams for convolution codes
			CO4	Design the Turbo codes and Space time codes and also their applications
29	2038192160	MOOCs 2	CO1	Connect openly on a global scale, with global learners and Instructors
			CO2	Develop high quality learning using multimedia platform

29	2038192188	MOOCs-2	CO3	Self assesment of their performance and learning process.
			CO4	Adapt a life long learning culture and updating the knowledge according with emerging trends
33	2038192138	Dissertation Phase -I	CO1	Apply knowledge of Electronics and communication engineering fundamentals to solve the
			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
			CO4	Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and
34	2038192238	Dissertation Phase -II	CO1	Apply knowledge of Electronics and communication engineering fundamentals to solve the
			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
			CO4	Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VR19 - COURSE OUTCOMES

Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
58	M.Tech-Computer Science and Engineering	2058191100	Mathematical Foundations of Computer Science	CO1	To apply the basic rules and theorems of probability theory such as Baye's Theorem, to determine probabilities that help to solve engineering problems and to determine the expectation
				CO2	Able to perform and analyze of sampling, means, proportions, variances and estimates the maximum likelihood based on
				CO3	To learn how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions
				CO4	Apply graph theory for real time problems like network routing
58	M.Tech-Computer Science and Engineering	2058191101	Advanced Data Structures & Algorithms	CO1	Ability to write and analyze algorithms for algorithm
				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.
58	M.Tech-Computer Science and Engineering	2058191110	Advanced Data Structures & Algorithms Lab	CO1	Identify classes, objects, members of a class and relationships among them needed for a specific problem.
				CO2	Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked
				CO3	Apply and analyze functions of Dictionary.
				CO4	Implement Programs on Hashing.
58	M.Tech-Computer Science and Engineering	2058191111	Advanced Computing Lab	CO1	The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays
				CO2	Development and use of s IoT technology in Societal and
				CO3	Skills to undertake high quality academic and industrial
				CO4	To classify Real World IoT Design Constraints, Industrial
58	M.Tech-Computer Science and Engineering	2058191150	Artificial Intelligence	CO1	Identify Methods in AI that may be suited to solving a given
				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.
58	M.Tech-Computer Science and Engineering	2058191151	Digital ImageProcessing	CO1	Demonstrate the components of image processing.
				CO2	Explain various filtration techniques.
				CO3	Apply image compression techniques.
				CO4	Discuss the concepts of wavelet transforms.
58	M.Tech-Computer Science and Engineering	2058191152	Advanced OperatingSystems	CO1	Illustrate on the fundamental concepts of distributed operating systems, its architecture and distributed mutual exclusion.
				CO2	Analyze on deadlock detection algorithms and agreement
				CO3	Make use of algorithms for implementing DSM and its scheduling for protection and security in distributed operating
				CO4	Elaborate on concurrency control mechanisms in distributed
58	M.Tech-Computer Science and Engineering	2058191153	Advanced ComputerNetworks	CO1	Illustrate reference models with layers, protocols and
				CO2	Describe the routing algorithms, Sub netting and Addressing of
				CO3	Describe and Analysis of basic protocols of computer networks, and how they can be used to assist in network design
				CO4	Describe the concepts Wireless LANS, WIMAX, IEEE 802.11, Cellular telephony and Satellite networks.
58	M.Tech-Computer Science and Engineering	2058191154	Internet of Things	CO1	Summarize on the term 'internet of things' in different contexts.
				CO2	Design a PoC of an IoT system using Rasperry Pi/Arduino.
				CO3	Apply data analytics and use cloud offerings related to IoT.
				CO4	Analyze applications of IoT in real time scenario.
58	M.Tech-Computer Science and Engineering	2058191155	Object Oriented SoftwareEngineering	CO1	Apply the Object Oriented Software-Development Process to design software.
				CO2	Analyze and Specify software requirements through a SRS documents.
				CO3	Design and Plan software solutions to problems using an object-oriented strategy.
				CO4	Model the object oriented software systems using Unified Modeling Language (UML).
58	M.Tech-Computer Science and Engineering	2000191100	Research Methodology and IPR	CO1	Discuss the process used for research Problem selection and Research Paper Writing.
				CO2	Interpret the Patent writing and Development.
				CO3	Describe the Procedure for Grant of Patents.
				CO4	Illustrate new Developments in IPR.
58	M.Tech-Computer Science and Engineering	2000191130	Soft skills (Audit course)	CO1	**Teamwork** – learning to connect and work with others to achieve a set task.
				CO2	**Leadership** – assessing the requirements of a task, identifying the strengths within the team, utilizing the diverse skills of the group to achieve the set objective, awareness of risk/safety.

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58	M.Tech-Computer Science and Engineering	2000191130	Disaster Management (Audit course)	CO1	learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
				CO2	critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
				CO3	develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
				CO4	critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries.

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58	M.Tech-Computer Science and Engineering	2000191130	Pedagogy Studies (Audit course)	CO1	What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
				CO2	What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
				CO3	How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?
				CO4	
58	M.Tech-Computer Science and	2000191130	Stress Management By Yoga (Audit	CO1	Develop healthy mind in a healthy body thus improving social health also.
				CO2	Improve efficiency.
58	M.Tech-Computer Science and Engineering	2058191200	Machine learning	CO1	Domain Knowledge for Productive use of Machine Learning and Diversity of Data. Demonstrate on Supervised and Computational Learning.
				CO2	Analyze on Statistics in learning techniques and Logistic Regression Illustrate on Support Vector Machines and Perceptron Algorithm.
				CO3	Design a Multilayer Perceptron Networks and classification of decision tree.
				CO4	Demonstrate how to apply a variety of learning algorithms to data.
58	M.Tech-Computer Science and Engineering	2058191201	Big DataAnalytics	CO1	Illustrate on big data and its use cases from selected businessdomains.
				CO2	Interpret and summarize on No SQL,Cassandra.
				CO3	Analyze the HADOOP and Map Reduce technologies associated with big data analytics and explore on Big Data applications UsingHive.
				CO4	Make use of Apache Spark, RDDs etc. to work withdatasets.
58	M.Tech-Computer Science and Engineering	2058191210	Machine Learning with python lab	CO1	Implement procedures for the machine learning algorithms.
				CO2	Design Python programs for various Learning algorithms.
				CO3	Apply appropriate data sets to the Machine Learning algorithms.
				CO4	Identify and apply Machine Learning algorithms to solve real world problems.
58	M.Tech-Computer Science and Engineering	2058191211	Big Data Lab	CO1	Illustrate on Bigdata and its usecases from selected business domains.
				CO2	Analyse the Hadoop with Java and Map reduce techniques associated with big data.
				CO3	analyze and explore on big data applications using HIVE.
				CO4	Access real time processing with Hadoop.
58	M.Tech-Computer Science and Engineering	2058191250	Advanced Databases and Mining	CO1	Analyze on normalization techniques.
				CO2	Elaborate on concurrency control techniques and query optimization.
				CO3	Summarize the concepts of data mining, data warehousing and data preprocessing strategies.
				CO4	Apply data mining algorithms.
58	M.Tech-Computer Science and Engineering	2058191251	Ad Hoc & Sensor Networks	CO1	Explain the Fundamental Concepts and applications of ad hoc and wireless sensor networks.
				CO2	Discuss the MAC protocol issues of ad hocnetworks.
				CO3	Enumerate the concept of routing protocols for ad hoc wireless networks with respect to TCP design issues.
				CO4	Analyze & Specify the concepts of network architecture and MAC layer protocol for WSN.
58	M.Tech-Computer Science and Engineering	2058191252	SoftComputing	CO1	Elaborate fuzzy logic and reasoning to handle uncertainty in engineeringproblems.
				CO2	Make use of genetic algorithms to combinatorial optimizationproblems.
				CO3	Distinguish artificial intelligence techniques, including search heuristics, knowledge representation, planning andreasoning.
				CO4	Formulate and apply the principles of self-adopting and self organizing neuro fuzzy inference systems.
58	M.Tech-Computer Science and Engineering	2058191253	CloudComputing	CO1	Interpret the key dimensions of the challenge of CloudComputing.
				CO2	Examine the economics, financial, and technological implications for selecting cloud computing for ownorganization.
				CO3	Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-basedapplications.
				CO4	Evaluate own organizations' needs for capacity building and training in cloud computing-related IT areas.

Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
58	M.Tech-Computer Science and Engineering	2058191254	Principles of Computer Security	CO1	Describe the key security requirements of confidentiality, integrity, and availability, types of security threats and attacks and summarize the functional requirements for computersecurity.
				CO2	Explain the basic operation of symmetric block encryption algorithms, use of secure hash functions for message authentication, digital signaturemechanism.
				CO3	Discuss the issues involved and the approaches for user authentication and explain how access control fits into the broader context that includes authentication, authorization, andaudit.
				CO4	Explain the basic concept of a denial-of-service attack, nature of flooding attacks, distributed denial- of-service attacks and describe how computer security vulnerabilities are a result of poor programmingpractices.
58	M.Tech-Computer Science and Engineering	2058191255	High Performance Computing	CO1	Design, formulate, solve and implement high performance versions of standard single threaded algorithms.
				CO2	Demonstrate the architectural features in the GPU and MIC hardware accelerators.
				CO3	Design programs to extract maximum performance in a multicore, shared memory execution environment processor.
				CO4	Develop and deploy large scale parallel programs on tightly coupled parallel systems using the message passing paradigm.

Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
58	M.Tech-Computer Science and Engineering	2058191270	Mini Project with Seminar	CO1	Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of computer science and engineering.
				CO2	Simulate and analyze the results reported in the chosen paper for seminar topic.
				CO3	Communicate effectively before the expert panel and develop technical reports.
				CO4	Respond to the queries raised by the evaluation committee and audience.
58	M.Tech-Computer Science and Engineering	2025191270	Constitution of India (Audit Course)	CO1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
				CO2	Understand state and central policies, fundamental uties.
				CO3	Understand Electoral Process, special provisions.
				CO4	Understand powers and functions of Municipalities, Panchayats and Cooperative Societies.
58	M.Tech-Computer Science and Engineering	2025191270	Sanskrit For Technical Knowledge (Audit Course)	CO1	Understanding basic Sanskrit language.
				CO2	Ancient Sanskrit literature about science & technology can be understood Being a logical language will help to develop logic in.
58	M.Tech-Computer Science and	2025191270	Value Education (Audit Course)	CO1	Knowledge of self-development.
				CO2	Learn the importance of Human values 3.Developing the overall personality.
[illegible]	M.Tech-Computer Science and Engineering	2025191270	Personality Development Through Life Enlightenment Skills (Audit	CO1	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.
				CO2	The person who has studied Geeta will lead the nation and mankind to peace and prosperity Study of Neetishatakam will help in developing versatile personality of students.
58	M.Tech-Computer Science and Engineering	2058192150	Deep Learning	CO1	Demonstrate the basic concepts fundamental learning techniques and layers.
				CO2	Discuss the Neural Network training, various random models.
				CO3	Explain different types of deep learning network models.
				CO4	Classify the Probabilistic Neural Networks.
58	M.Tech-Computer Science and Engineering	2058192151	Social Network Analysis	CO1	Demonstrate social network analysis and measures.
				CO2	Analyze random graph models and navigate social networks data.
				CO3	Apply the network topology and Visualization tools.
				CO4	Analyze the experiment with small world models and clustering models.
58	M.Tech-Computer Science and Engineering	2058192152	MOOCs-1	CO1	Connect openly on a global scale, with global learners and instructors.
				CO2	Develop high quality learning using multimedia platform.
				CO3	Self assessment of their performance and learning process.
				CO4	Develop a life long learning culture and updating the knowledge according with emerging trends.
58	M.Tech-Computer Science and Engineering	2058192160	MOOCs-2	CO1	Connect openly on a global scale, with global learners and instructors.
				CO2	Develop high quality learning using multimedia platform.
				CO3	Self assessment of their performance and learning process.
				CO4	Develop a life long learning culture and updating the knowledge according with emerging trends.
58	M.Tech-Computer Science and Engineering	2058192170	Dissertation-I/ Industrial Project #	CO1	apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint.
				CO2	Ability to perform individually accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success.
				CO3	Ability to use formal and informal communications with guide, make presentations and prepare technical document.
				CO4	Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems.
58	M.Tech-Computer Science and Engineering	2058192270	Dissertation-II	CO1	apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint.
				CO2	Ability to perform individually accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success.
				CO3	Ability to use formal and informal communications with guide, make presentations and prepare technical document.
				CO4	Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems.

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Information Technology (A)
Duvvada, VSEZ, Duvvada, Visakhapatnam-49

VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY

DEPARTMENT OF IT

VR - 19 COURSEOUTCOMES

Programme Code	Programme Name	Course Code	Course Name	Course Outcome: After the completion of the course student will be able to
40	M.Tech-Information Technology	2040191100	Discrete Mathematical Structures	To understand the basic notions of discrete and continuous
				To understand the methods of statistical inference, and the role that sampling distributions play in those methods.
				To be able to perform correct and meaningful statistical analyses of simple to moderate complexity.
				Illustrate properties and characteristics of various graphs and optimization techniques
40	M.Tech-Information Technology	2040191101	Advanced Data Structures	Understand the implementation of symbol table using hashing
				Develop and analyze algorithms for red-black trees, B-trees and
				Develop algorithms for text processing applications.
				Identify suitable data structures and develop algorithms for computational geometry problems.
40	M.Tech-Information Technology	2040191150	Artificial Intelligence	Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
				Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based
				Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing.
				Solve problems with uncertain information using Bayesian
40	M.Tech-Information Technology	2040191151	Service Oriented Architectures and Web Security	Understand the basics of XML.
				Learn the concepts of SOA and Web services.
				find different approaches for providing security for XML documents as well as messages exchanged among Web Services.
				determine some of the prevailing standards and technologies of
40	M.Tech-Information Technology	2040191152	Internet of Things	Summarize on the term 'internet of things' in different contexts.
				Design a PoC of an IoT system using Rasperry Pi/Arduino.
				Apply data analytics and use cloud offerings related to IoT.
				Analyze applications of IoT in real time scenario.
40	M.Tech-Information Technology	2040191153	Optimization Techniques	Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.
				Students should able to apply the concept of non-linear
				Students should able to carry out sensitivity analysis.
				Student should able to model the real world problem and simulate
40	M.Tech-Information Technology	2040191154	Parallel Computer Architecture	Students accustomed with the representation of data, addressing modes, and instructions sets.
				Students able to understand parallelism both in terms of a single processor and multiple processors.
				Technical knowhow of parallel hardware constructs to include instruction-level parallelism for multi core processor design.
				Use different performance metrics for analysis of parallel
40	M.Tech-Information Technology	2040191155	Big Data Analytics	Understand the programming requirements viz., generic types and methods to perform data analysis.
				Formulate an effective strategy to implement a successful Data
				To understand and analyze Map-Reduce programming model for better optimization.
				Identify the need based tools, viz., Pig and Hive and to handle.
40	M.Tech-Information Technology	2040191156	Principles of Cryptography	Building a new unbreakable cryptosystem.
				Blending the existing cryptographic algorithms with the existing communication protocols.
				Analyzing and application of cryptography for secure eCommerce and other secret transactions.
				Clasify various cryptographic protocols, hash functions, digital signature schemes.
40	M.Tech-Information Technology	2040191157	Cluster and Grid Computing	student will have knowledge of Grid Computing.
				student will have knowledge in web services and service-oriented
				student will have knowledge of Architecture for grid computing and Cluster Computing.
				student will have knowledge of process scheduling and load
40	M.Tech-Information Technology	2040191158	Imaging and Multimedia Systems	Technical know to develop new compression standards.
				Acquire skill set to handle all multimedia components efficiently.
				Develop Integrated and Collaborative multimedia systems.
				Execute various algorithms require for image and multimedia
				Demonstrate basic concepts in graph theory: coloring, planar

40	M.Tech-Information Technology	2040191159	Advanced Graph Theory	Evaluate precise and accurate mathematical definitions of objects in graph theory. Build some classical graph algorithms in order to find sub graphs with desirable properties. Compile and deduce properties of chromatic numbers and polynomials and identify certain problems as graph colouring
40	M.Tech-Information Technology	2000191100	Research Methodology and IPR	Understand the research problem, process and ethics. Prepare a well-structured research paper and scientific Explore on various IPR components and process of filing. Understand the adequate knowledge on patent and rights
40	M.Tech-Information Technology	2040191110	Advanced Data Structures Lab	Implement List ADTs and their operations. Develop programs for implementing trees algorithms. Implement graph algorithms. Apply algorithm design techniques.
40	M.Tech-Information Technology	2040191111	Computing Lab	Implement real time problems using python. Develop programs for AI Techniques using Python. Implement big data problems using Hadoop. Apply algorithm design techniques on cryptography.
40	M.Tech-Information Technology	2000191130	English for Research Paper Writing	Understand that how to improve your writing skills . readability Learn about what to write in each section. Understand the skills needed when writing a Title Ensure the good quality of paper at very first- time submission. applying the knowledge in writing a technical paper and process of submission in qualititative journals.
40	M.Tech-Information Technology	2000191131	Disaster Management	Understanding foundations of hazards, disasters and associated natural/social phenomena. Familiarity with disaster management theory (cycle, phases). Methods of community involvement as an essential part of successful DRR and Analyze Risk Assessment and Strategies for Technological innovations in Disaster Risk Reduction: Advantages and problems.
40	M.Tech-Information Technology	2000191132	Sanskrit for Technical Knowledge	Understanding basic Sanskrit language. Ancient Sanskrit literature about science & technology can be Being a logical language will help to develop logic in students. Learning Sanskrit Grammar, History of Sanskrit Literature,Drama.
40	M.Tech-Information Technology	2000191133	Value Education	Knowledge of self-development. Learn the importance of Human values. Developing the overall personality. Learn the importance of value education towards personal, national and global development.
40	M.Tech-Information Technology	2040191200	Advanced Algorithms	Introduce students to the advanced methods of designing and analyzing algorithms. The student should be able to choose appropriate algorithms and use it for a specific problem. To familiarize students with basic paradigms and data structures used to solve advanced algorithmic problems. To introduce the students to recent developments in the area of algorithmic design.
40	M.Tech-Information Technology	2040191201	Full Stack Technologies	Identify the Basic Concepts of Web & Markup Languages. Creating & Running Applications using JSP libraries. Creating Our First Controller Working with and Displaying in Angular Js and Nested Forms with ng-form. Working with the Files in React JS and Constructing Elements
40	M.Tech-Information Technology	2040191250	Machine Learning	Domain Knowledge for Productive use of Machine Learning and Diversity of Data. Demonstrate on Supervised and Computational Learning. Analyze on Statistics in learning techniques and Logistic Illustrate on Support Vector Machines and Perceptron Algorithm and Design a Multilayer Perceptron Networks and classification of
40	M.Tech-Information Technology	2040191251	DevOps	Understand the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility Describe DevOps & DevSecOps methodologies and their key Explain the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models. Set up complete private infrastructure using version control systems and CI/CD tools.
40	M.Tech-Information	2040191252	Advanced Network Principles and	Familiarization of the different layers of TCP/IP protocol stack. Analyze the Concepts of Network media and topologies, Network security concepts and Network management.

40	Information Technology	2040191252	Principles and Protocols	Understanding of the working principle of different protocols at Plan the interworking of distributed application basing on Semantic Web technology.
40	M.Tech-Information Technology	2040191253	Distributed Computing	Elucidate the foundations and issues of distributed systems. Describe the features of peer-to-peer and distributed shared memory systems and Understand the various synchronization issues and global state for distributed systems. Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems. Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
40	M.Tech-Information Technology	2040191254	ocial Network Analytic	Demonstrate social network analysis and measures and components of virtual communities. Analyze random graph models and navigate social networks data. Apply the network topology and Visualization tools. Analyze the experiment with small world models and clustering
40	M.Tech-Information Technology	2040191255	igital Image Processin	Demonstrate the components of image processing and usage of various filteration techniques. Apply image compression techniques. Discuss the concepts of wavelet transforms. Analyze the concept of morphological image processing.
40	M.Tech-Information Technology	2040191256	ock Chain Technologi	Demonstrate the foundation of the Block chain technology and understand the processes in payment and funding. Identify the risks involved in building Block chain applications and how to earn profit from trading cryptocurrencies. Review of legal implications using smart contracts. Choose the present landscape of Blockchain implementations and Understand Crypto currency markets.
40	M.Tech-Information Technology	2040191257	Data Science	Explain how data is collected, managed and stored for data Understand the key concepts in data science, including their real-world applications. Implement data collection and management scripts using Evaluate toolkits used by various data scientist on real world
40	M.Tech-Information Technology	2040191258	Soft Computing	Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory. Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations. Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications.
40	M.Tech-Information Technology	2040191259	Natural Language Processing	Explain approaches to syntax and semantics in NLP. Demonstrate approaches to discourse, generation, dialogue and summarization within NLP. Identify machine learning techniques used in NLP, including hidden Markov models and probabilistic. Explain context-free grammars, clustering and unsupervised methods, log-linear and discriminative models, and the EM
40	M.Tech-Information Technology	2040191210	dvance Algorithms La	Identify classes, objects, members of a class and relationships among them needed for a specific problem. Examine algorithms performance using Prior analysis and Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked lists, graphs and Apply and analyze functions of Dictionary.
40	M.Tech-Information Technology	2040191211	l Stack Technologies I	Develop web Applications using Scripting Languages & Creating & Running Applications using JSP libraries. Creating Our First Controller Working with and Displaying in Angular Js and Nested Forms with ng- form. Working with the Files in React JS and Constructing Elements
40	M.Tech-Information Technology	2040191270	ini Project with Semir	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. Simulate and analyze the results reported in the chosen paper for Communicate effectively before the expert panel and develop Respond to the queries raised by the evaluation committee and
	M.Tech-			Discuss the growth of the demand for civil rights in India for the Discuss the intellectual origins of the framework of argument that

40	M.Tech-Information Technology	2000191230	Constitution of India	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
				Discuss the passage of the Hindu Code Bill of 1956.
40	M.Tech-Information Technology	2000191231	Pedagogy Studies	What pedagogical practices are being used by teachers in formal
				What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of
				How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective
				Encourage Cooperative Learning Environment.
40	M.Tech-Information Technology	2000191232	ss Management by Y	Develop healthy mind in a healthy body thus improving social
				Improve efficiency.
				Reduces Stress and Anxiety.
				Identify and apply injury prevention principles related to yoga
40	M.Tech-Information Technology	2000191233	Personality Development through Life Enlightenemnt Skills	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.
				The person who has studied Geeta will lead the nation and mankind to peace and prosperity.
				Study of Neetishatakam will help in developing versatile
				To re-engineer attitude and understand its influence on behavior.
40	M.Tech-Information Technology	2040192150	Deep Learning	Demonstrate the basic concepts fundamental learning techniques
				Discuss the Neural Network training, various random models.
				Explain different types of deep learning network models.
				Classify the Probabilistic Neural Networks and deep learning
40	M.Tech-Information Technology	2040192151	Embedded Computing	Knowledge and understanding of Embedded Linux OS Architecture, Linux Kernel Modules.
				Describes the differences between the general computing system and the embedded computing system.
				Write client server program using TCP sockets.
				Knowledge on IPv4 and IPV6 addresses.
40	M.Tech-Information Technology	2040192152	Ethical Hacking	Learn various hacking methods.
				Perform system security vulnerability testing.
				Perform system vulnerability exploit attacks.
				Produce a security assessment report and issues related to hacking.
40	M.Tech-Information Technology	2040192153	Digital Marketing	Explain about web pages with basic HTML5, DHTML tags using CSS and XML, the overview of W3C DOM.
				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.
				Apply search engine optimization techniques to a website.
				Illustrate how the effectiveness of a digital marketing campaign
40	M.Tech-Information Technology	2040192160	Python Programming	Understand and comprehend the basics of python programming.
				Demonstrate the principles of structured programming and be able to describe, design, implement, and test structured programs using currently accepted methodology.
				Explain the use of the built-in data structures list, sets, tuples and
				Identify real-world applications using oops, files and exception handling provided by python.
40	M.Tech-Information Technology	2040192161	Web Technologies	Understand the concepts of Java Script and develop a dynamic webpage by the use of Java Script.
				Write a well formed / valid XML document and describe the
				Creating & Running PHP script and also to connect & working with DBMS such as MySql.
				Understand the concepts PERL & RUBY and develop the web applications by using PERL & RUBY.
40	M.Tech-Information Technology	2040192162	Artificial Intelligence	Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
				Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based
				Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing.
				Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or
40	M.Tech-Information Technology	2040192163	Internet of Things	Summarize on the term 'internet of things' in different contexts.
				Analyze various protocols for IoT.
				Design a PoC of an IoT system using Rasperry Pi/Arduino and Apply data analytics and use cloud offerings related to IoT.
				Analyze applications of IoT in real time scenario.
	M.Tech			Domain Knowledge for Productive use of Machine Learning and Diversity of Data.

40	M.Tech-Information Technology	2040192164	Machine Learning	Demonstrate on Supervised and Computational Learning and Analyze on Statistics in learning techniques and Logistic
				Illustrate on Support Vector Machines and Perceptron Algorithm.
				Design a Multilayer Perceptron Networks and classification of
40	M.Tech-Information Technology	2040192165	Advanced Data Structures	Understand the implementation of symbol table using hashing
				Develop and analyze algorithms for red-black trees, B-trees and
				Develop algorithms for text processing applications.
				Identify suitable data structures and develop algorithms for computational geometry problems.
40	M.Tech-Information Technology	2040192170	Dissertation-I/Industrial Project	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
				Perform individually as well as in a team, accepting responsibility, taking initiative, and providing leadership, necessary to ensure
				Use formal and informal communications with team members and guide, make presentations and prepare technical document.
				Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent
40	M.Tech-Information Technology	2040192270	Dissertation-II	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
				Perform individually as well as in a team, accepting responsibility, taking initiative, and providing leadership, necessary to ensure
				Use formal and informal communications with team members and guide, make presentations and prepare technical document.
				Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent

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VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)

DEPARTMENT OF MECHANICAL ENGINEERING

VR19 - COURSE OUTCOMES

Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
15	M.Tech-Machine Design	2000191100	Research Methodology and IPR	CO1	Discuss the process used for research Problem selection and
				CO2	Interpret the Patent writing and Development
				CO3	Describe the Procedure for Grant of Patents
				CO4	Illustrate new Developments in IPR
15	M.Tech-Machine Design	2015191100	Advanced Mechanics of Solids	CO1	Solve stress, strain calculatins
				CO2	Examine different failure criteria for different members
				CO3	Evaluate the various parameters to stop unsymmetrical bending
				CO4	Compile the torsion coming on to the machine components
15	M.Tech-Machine Design	2015191101	Mechanical Vibrations and Acoustics	CO1	Understand the basic concepts of Acoustics and Noise, noise measuring instruments and control the noise using diffrent noise
				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
15	M.Tech-Machine Design	2015191110	Machine Dynamics Lab	CO1	Calculate the damped and undamped natural frequency and amplitude of the vibrating system from experiment
				CO2	Test for the balancing of masses in static and dynamic cases
				CO3	Evaluate the magnitude of gyroscopic couple, angular velocity of
				CO4	Explain the Direct and Inverse kinematic of a robot
15	M.Tech-Machine Design	2015191111	Design Practice Lab-I	CO1	Classify the various types of load applications
				CO2	Decide the correct profile of the components
				CO3	Create the final dimensions of the components
				CO4	Constuct the final component in all the parameters
15	M.Tech-Machine Design	2015191150	Design of Modern Vehicle Systems	CO1	Understand the safety and conseptual design of Automobiles. design of structural elements and load analysis for different
				CO2	Identify the Basic design, performance of Electric vehicles (EV), and Hybridness of vehicles and their performance .
				CO3	Understand Working Principle and Design of UAVs/Drones and their Applications,Flight controller, Remote Controller and
				CO4	Analyze Safety aspects of automobiles and energy absorbing systems through testing(lab, field testing.
15	M.Tech-Machine Design	2015191151	Product Design	CO1	To understand the basic concept a product design based on the
				CO2	Generate the concept of new product and different fabrication
				CO3	Make the solid model in virtual platform and evaluate the product
				CO4	Selecting the correct process of fabrication to optimze the cost and
15	M.Tech-Machine Design	2015191152	Design for Manufacturing & Assembly	CO1	Understand to relate design rules for manufacturability.
				CO2	Apply design rules for ease of machining.
				CO3	Enumerate the general design considerations for casting, casting
				CO4	Apply design guidelines to assembly.
15	M.Tech-Machine Design	2015191153	Fracture Mechanics	CO1	Identify the prediction of mechanical failure and discuss various
				CO2	Employ the concept of griffith's analysis for energy release rate and describe the concept of stress intensity factor in linear elastic
				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
15	M.Tech-Machine Design	2015191154	Advanced Mechanisms	CO1	Understand the various degreesof freedom in various linkages of
				CO2	Analyze the synthesis of mechanism using analytical methods
				CO3	Analyze the plane motion in mechanism graphically
				CO4	Evaluate the maipulator kinematics with D-H notation
15	M.Tech-Machine Design	2015191155	Non-Destructive Evaluation	CO1	Identify various surface flaws by using Liquid penetrant inspection and Magnetic particle inspection.
				CO2	Apply the systematic understanding of knowledge on radiography
				CO3	Demonstrate comprehensive understanding of Ultrasonic
				CO4	Summarize the various techniques of optical holography and
15	M.Tech-Machine Design	2015191156	Robotics	CO1	Summarize robot components, configurations and different end
				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
				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
15	M.Tech-Machine Design	2015191157	Geometric Modeling	CO1	Use various mathematical equation to represent curves.
				CO2	Apply the cubic splines in modeling of a product.
				CO3	Select appropriate synthetic curves in modeling process.
				CO4	Implement the surface modeling for design of various consumer
15	M.Tech-Machine Design	2015191158	Multi Body Dynamics	CO1	To meet desired needs and solve engineering problems
				CO2	Understand and implement the dynamics of the planar and spatial
				CO3	Inverse dynamic analysis and forward dynamic analysis of the
				CO4	Analyse the formulations of spatial multi body systems.

Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
15	M.Tech-Machine Design	2015191159	Vision Systems and Image Processing	CO1	Suggest and explain the physical requriements for developing a
				CO2	Explain various image represention techniques and image
				CO3	Select and Explain a suitable image enhancement technique for a
				CO4	Summarize various image compression techniques
15	M.Tech-Machine Design	2015191200	Advanced Finite Element Methods	CO1	Understand the concepts of potential energy, Raleigh Ritz method and weighted residual methods.
				CO2	Identify the suitable FEA elements such as bars, truss, beams, constant strain triangle and isoparametric elements to create Finite
				CO3	Apply suitable boundary conditions to the finite element model and solve the engineering problems
				CO4	Solve problems involving dynamics and heat transfer.
15	M.Tech-Machine Design	2015191201	Advanced Machine Design	CO1	Design mechanical components by selecting a suitable material
				CO2	Evaluate fatigue life of mechanical components for ductile and
				CO3	Analyze and predict the fracture strength of mechanical components under different fracture modes
				CO4	Design mechanical components involving contacts avoiding the
15	M.Tech-Machine Design	2015191210	Computational Mathematics Lab	CO1	Apply MATLAB and Python code for solving a system of linear equationusing using Gauss Elimination Method.
				CO2	Apply MATLAB and Python code for Iterative methods to solve equations using Jacobil teration.
				CO3	Apply MATLAB and Python code for Matrices and Eigenvalues
				CO4	Apply MATLAB and Python code for Partial Differentialequations
15	M.Tech-Machine Design	2015191211	Design Practice Lab-II	CO1	Classify the various types of load applications
				CO2	Decide the correct profile of the components
				CO3	Create the final dimensions of the components
				CO4	Constuct the final component in all the parameters
15	M.Tech-Machine Design	2015191250	Theory of Plasticity	CO1	Understand the importance of yield point in the stress analysis.
				CO2	Analyze the governing equations of plasticity
				CO3	Apply principles of plasticity in the design analysis
				CO4	Develop constitutive models based on experimental results on
15	M.Tech-Machine Design	2015191251	Signal Analysis and Condition Monitoring	CO1	Understand basic concepts of Fourier analysis, Bandwidth, Signal,
				CO2	Analysis of stationary signals.
				CO3	Analysis of continuous non-stationary signals.
				CO4	Apply condition monitoring in real systems.
15	M.Tech-Machine Design	2015191252	Computational Fluid Dynamics	CO1	Understand the fundamental of finite element method.
				CO2	Use the finite element method to solve fluid dynamics problems.
				CO3	Formulation the equations for incompressible and compressible flows using various avaible metyhod
				CO4	Implement finite volume method and Standard variational methods
15	M.Tech-Machine Design	2015191253	Composite Materials	CO1	Understand the importance of composite materials
				CO2	Distinguish various materials used for matrix and reinforcement
				CO3	Recommend the composite material according to the application
				CO4	Modify the material according to the types of loads coming on to
15	M.Tech-Machine Design	2015191254	Soft Computing	CO1	Learn about soft computing techniques and their applications
				CO2	Define the fuzzy systems
				CO3	Analyze the genetic algorithms and their applications.
				CO4	Analyze various neural network architectures
15	M.Tech-Machine Design	2015191255	Experimental Techniques and data Analysis	CO1	Clean and manipulate raw data sets so they are ready for analysis
				CO2	Determine and carry out the appropriate statistical test for a variety of experimental questions about different data sets
				CO3	Draw conclusions about whether research hypotheses have been
				CO4	Plan the statistical analysis of an independent research project
15	M.Tech-Machine Design	2015191256	Design with advanced Materials	CO1	Understand the concepts such as elasticity in materials, plastic deformation, and advanced concepts like solid solution and
				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.
15	M.Tech-Machine Design	2015191257	Mechatronics	CO1	Understand the basic concepts behind design considerations of mechatronics systems, various actuators, and drive systems.
				CO2	Develop motion control algorithms using fuzzy logic
				CO3	Analyze sensor interfacing and architecture of intelligent
				CO4	Assess the machine vision concept and various micro
15	M.Tech-Machine Design	2015191258	Tribology	CO1	Illustrate the fundamentals of tribology and the tribological
				CO2	Explain about various Lubrication Technquies
				CO3	Demonstrate about bearing propeties and analyze about bearing
				CO4	Classify different types of seals and its uses
15	M.Tech-Machine Design	2015191259	Experimental Modal Analysis	CO1	Understand different modal analysis: Vibrations of single and
				CO2	Analyse Frequency response functions measurement.
				CO3	Understand Inverse Method, Residuals MDOF, curve-fitting
				CO4	Apply Model correlation and modal assurance criterion for

Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
15	M.Tech-Machine Design	2015191270	Mini Project with Seminar	CO1	Carryout literature survey, and choose a relevant topic reported in recent SCI / IEEE/ Scopus / conference publications / transactions
				CO2	Simulate and analyze the results reported in the chosen paper for
				CO3	Communicate effectively before the expert panel and develop
				CO4	Respond to the queries raised by the evaluation committee and
15	M.Tech-Machine Design	2015192150	Industrial Robotics	CO1	Summarize robot components, configurations and different end
				CO2	Fourmulate the kinematics and dynamics of a mainpulator
				CO3	Write a program to manipluate the end effector of a robot to move
				CO4	Select a robot for a given industrial application and Design its cell
15	M.Tech-Machine Design	2015192151	Advanced Optimization Techniques	CO1	Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems
				CO2	Use classical optimization techniques and numerical methods of
				CO3	Describe the basics of different evolutionary algorithms
				CO4	Enumerate fundamentals of Integer programming technique and apply different techniques to solve various optimization problems
15	M.Tech-Machine Design	2015192152	Additive Manufacturing	CO1	Recognize the development of Additive Manufacturing technology and opportunities for transforming a concept into product
				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.
15	M.Tech-Machine Design	2015192153	Mechanics of Composite Materials	CO1	Understand the importance of composite materials
				CO2	Distinguish various materials used for matrix and reinforcement
				CO3	Recommend the composite material according to the application
				CO4	Modify the material according to the types of loads coming on to
15	M.Tech-Machine Design	2015192154	Vehicle Dynamics	CO1	Identify the dynamic forces acting on different parts of the vehicle
				CO2	Understand the behaviour of pneumatic tyres and stability of
				CO3	Correlate the course materials to the daily driving experience of a
				CO4	Apply the mechanical theories on the vehicle dynamics design.
15	M.Tech-Machine Design	2015192160	Operations Research	CO1	Develop the different linear programming and assignment models
				CO2	Analyze the different transportation models.
				CO3	Design inventory and queueing theory models for optimal
				CO4	Apply optimal strategy to real time applications using dynamic
15	M.Tech-Machine Design	2015192170	Project Phase -I/ Industrial Project #	CO1	Analyze a complex engineering problem and to apply principles of mechanical engineering and relevant disciplines to idenitfy
				CO2	Determine suitable methodology to attain at a sustainable solutions
				CO3	Design, implement, and optimize the solution to meet all the
				CO4	Recognize professional responsibilities and make informed judgments in mechanical domain based on legal and ethical
15	M.Tech-Machine Design	2015192270	Project Phase -II	CO1	apply the mechanical engineering principles in planning, formulating an innovative design/ approach to chosen topic within
				CO2	Ability to perform individually accepting responsibility, taking initiative, and providing leadership, necessary to ensure project
				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

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VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VR - 19 COURSE OUTCOMES

Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
42	M.Tech-Power and Industrial Drives	2042191100	Electrical MachineModel ing andAnalysis	CO1	Understand the behavior of DC motors and also model the different Dc motors.
				CO2	Apply the knowledge of reference frame theory for AC machines to model the induction and Synchronous machine
				CO3	Evaluate the steady state and transient behaviour of induction and synchronous machines to Propose the suitability of drives for different industrial application
				CO4	Analyze the characteristics of different types of DC motors and 2-Phase induction machines using voltage and torque equations to differentiate the behaviour and to propose their applications in real world
42	M.Tech-Power and Industrial Drives	2042191101	Analysis of PowerElectronic 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.
42	M.Tech-Power and Industrial Drives	2042191110	PowerElectronics SimulationLabor atory	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
42	M.Tech-Power and Industrial Drives	2042191111	PowerConverters Laboratory	CO1	Experimentally understand the different converters
				CO2	Experimentally understand the dual converter application
				CO3	experimentally understand inverters for single and three phase loads
				CO4	Design of gate drive circuits for IGBT & MOSFET"s.
42	M.Tech-Power and Industrial Drives	2042191150	ModernControlT heory	CO1	Understand the state variable approach's which are suitable for higher order systems
				CO2	Analyze the concepts of controllability and observability.
				CO3	Examine the stability and instability problems in continuous time invariant systems, various non-linearities using phase plane analysis and descriptive functions an
				CO4	Solve the optimal control problems for any continuous time invariant system
42	M.Tech-Power and Industrial Drives	2042191151	PowerQualityand CustomPowerDe vices	CO1	Identify the issues related to power quality in power systems and also address the problems of transient and long duration voltage variations in power systems.
				CO2	Analyze the effects of harmonics and study of different mitigation techniques.
				CO3	Understand the importance of custom power devices and their applications.
				CO4	Acquire knowledge on different compensation techniques to minimize power quality disturbances
42	M.Tech-Power and Industrial Drives	2042191152	ProgrammableLo gicControllers& Applications	CO1	Understand the PLCs and their I/O modules.
				CO2	Develop control algorithms to PLC using ladder logic etc.
				CO3	Manage PLC registers for effective utilization in different applications and also□□andle data functions & control of two axis, their axis robots with PLC.
				CO4	Design PID controller with PLC
42	M.Tech-Power and Industrial Drives	2042191153	ArtificialIntellige nceTechniques	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.
42	M.Tech-Power and Industrial Drives	2042191154	RenewableEnerg yTechnologies	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.
42	M.Tech-Power and Industrial Drives	2042191155	HVDCTransmiss ionandFlexibleA CTransmissionSy stems	CO1	Evaluate the HVDC converter configurations and assess the performance metrics.
				CO2	Understand controllers for controlling the power flow through a dc link and compute filter Parameters
				CO3	Apply impedance, phase angle and voltage control for real and reactive power flow in ac transmission systems with FACTS controller.
				CO4	Analyze and select a suitable FACTS controller for a given power flow condition.
42	M.Tech-Power and Industrial Drives	2042191200	Switched Mode Power Conversion	CO1	Analyze operation and control of non-isolated and isolated switch mode converters.
				CO2	Design of non-isolated and isolated switch mode converters
				CO3	Understand the operation and control of resonant converters
				CO4	Create the switch mode converters based on linearized models
42	M.Tech-Power and Industrial Drives	2042191201	Power Electronic Control of Electrical Drives	CO1	Understand the concepts of scalar and vector control methods for drive systems.
				CO2	Design controllers and converters for induction motor, PMSM and BLDC drives.
				CO3	Select and implement proper control techniques for induction motor and PMSM for specific applications
				CO4	Analyze the control techniques and converters for SRM drives.
42	M.Tech-Power and Industrial Drives	2042191210	Electric Drives Simulation Laboratory	CO1	Simulation of Buck converter, Boost converter, single-phase square wave inverter and PWM inverter.
				CO2	Design controllers and converters for induction motor, PMSM and BLDC drives
				CO3	Simulate D.C separately excited motor and transmission line by incorporating line, load and transformer models.
				CO4	Simulation of single phase AC voltage regulator with different loads.
42	M.Tech-Power and Industrial Drives	2042191211	Electric Drives Laboratory	CO1	Explain about characteristics of various power semiconductor devices and firing circuits.
				CO2	Analyze the performance of single-phase and three-phase full-wave bridge converters with both resistive, inductive and motor loads.
				CO3	Illustrate the working of Buck converter, Boost converter, single-phase square wave inverter and PWM inverter.
				CO4	Describe the operation of single phase AC voltage regulator with different loads.
42	M.Tech-Power and Industrial Drives	2042191250	Control & Integration of Renewable Energy Systems	CO1	Gain knowledge on different renewable energy sources and storage devices
				CO2	Recognize, model and simulate different renewable energy sources
				CO3	Analyze, model and simulate basic control strategies required for grid connection
				CO4	Implement a complete system for standalone/grid connected system

Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
42	M.Tech-Power and Industrial Drives	2042191251	Hybrid Electric Vehicles	CO1	Analyze the concept of electric vehicles and hybrid electric vehicles
				CO2	Discover the different motors used for hybrid electric vehicles
				CO3	Understand the power converters used in hybrid electric vehicles
				CO4	Know the different batteries and other energy storage systems.
42	M.Tech-Power and Industrial Drives	2042191252	Digital ControlSystems	CO1	Analyze digital control systems using Z-transforms and Inverse Z-Transforms
				CO2	Evaluate the state transition matrix and solve state equation for discrete model for continuous time systems, investigate the controllability and observability.
				CO3	Determine the stability; design state feedback controller.
				CO4	Solve a given optimal control problem
42	M.Tech-Power and Industrial Drives	2042191253	Advanced Digital Signal Processing	CO1	Design digital filters with different techniques and also describe structure of digital filter
				CO2	Understand the implementation aspects of signal processing algorithms.
				CO3	Know the effect of finite word length in signal processing.
				CO4	Analyze different power spectrum estimation techniques
42	M.Tech-Power and Industrial Drives	2042191254	Applications of PowerConverters	CO1	Analyze power electronic application requirements
				CO2	Identify suitable power converter from the available configurations
				CO3	Develop improved power converters for any stringent application requirements.
				CO4	Improvise the existing control techniques to suit the application. Design of Bi- directional converters for charge/discharge applications
42	M.Tech-Power and Industrial Drives	2042191255	Microcontrollers	CO1	Understand about DSP architecture and assembly programming for DSP processors.
				CO2	Design the interfacing circuits for input and output to PIC micro controllers and DSP processors
				CO3	Create ALP for DSP processing devices
				CO4	Design PWM controller for power electronic circuits using FPGA
42	M.Tech-Power and Industrial Drives	2042191270	Mini Project with Seminar	CO1	Carryout literature survey, and choose a relevant topic reported in recent IEEE/IET/Elsevier/ Springer/Taylor and Francis/conference publications / transactions in the domain of Electrical and Electronics Engineering.
				CO2	Simulate and analyze the results reported in the chosen paper for seminar topic.
				CO3	Communicate effectively before the expert panel and develop technical reports.
				CO4	Respond to the queries raised by the evaluation committee and audience
42	M.Tech-Power and Industrial Drives	2042192150	Digital Signal Processing Controlled Drives	CO1	Interface the DSP platform with sensors such as hall-effect voltage sensors,
				CO2	Understand the hall-effect current sensors, shaft encoder for data acquisition for motor drive applications and also use algorithms for the realization of controllers, Pulse Width Modulators and observers.
				CO3	Scale and normalize the data to suit the requirements of the drive system
				CO4	Exploit the architectural features of the DSP platform to design and implement
42	M.Tech-Power and Industrial Drives	2042192151	Smart Grid Technologies	CO1	Explain about the micro grids and distributed generation systems.
				CO2	Develop concepts of smart grid technologies in hybrid electrical vehicles etc.
				CO3	Understand smart substations, feeder automation, GIS, smart grids, smart grid policies and developments in smart grids
				CO4	Analyze the effect of power quality in smart grid and to understand latest developments in ICT for smart grid.
42	M.Tech-Power and Industrial Drives	2042192152	Modeling & Simulation of PowerElectronic Systems	CO1	Understand the back ground activities i.e. numerical solution used in the simulation software
				CO2	Choose the required numerical solver to be used for analysis
				CO3	Debug the convergence problems occurring during simulation
				CO4	Investigate different switching function technique and their properties of the switching
42	M.Tech-Power and Industrial Drives	2042192160	MOOCs	CO1	Analyze operation and control of differemt switch mode converters.
				CO2	Design of switch mode converters
				CO3	Understand the operation and control of resonant converters
				CO4	Create the switch mode converters based on linearized models
42	M.Tech-Power and Industrial Drives	2042192161	Renewable Energy Systems	CO1	Gain knowledge on different renewable energy sources and storage devices
				CO2	Recognize, model and simulate different renewable energy sources
				CO3	Analyze, model and simulate basic control strategies required for grid connection
				CO4	Implement a complete system for standalone/grid connected system
42	M.Tech-Power and Industrial Drives	2042192162	Optimization Techniques	CO1	Define an objective function and constraint functions in terms of design variables, and then state the optimization problem
				CO2	Solve single variable and multi variable optimization problems, without and with constraints.
				CO3	Apply linear and non-linear programming technique to an optimization problem.
				CO4	Explain basic principles of Genetic Algorithms and Particle Swarm Optimization methods
42	M.Tech-Power and Industrial Drives	2042192163	Programmable Logic Controller	CO1	Understand the PLCs and their I/Omodules.
				CO2	Develop control algorithms to PLC using ladderlogic.
				CO3	Manage PLC registers for effective utilization in different applications.
				CO4	Design Hardware configuration and develop logic for different Industrial Applications.
42	M.Tech-Power and Industrial Drives	2042192170	Dissertation-I/ Industrial Project #	CO1	Apply knowledge of Electrical and Electronics engineering fundamentals to solve the complex Engineering problems
				CO2	Design prototypes and solutions to solve the specific needs related with public health, safety, society and environment leading to sustainable development following ethical values
				CO3	Adapt appropriate techniques, resources and modern engineering tools during the implementation of project
				CO4	Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and self-development
42	M.Tech-Power and Industrial Drives	2042192270	Dissertation-II	CO1	Apply knowledge of Electrical and Electronics engineering fundamentals to solve the complex Engineering problems
				CO2	Design prototypes and solutions to solve the specific needs related with public health, safety, society and environment leading to sustainable development following ethical values
				CO3	Adapt appropriate techniques, resources and modern engineering tools during the implementation of project
				CO4	Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and self-development

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VR19 - COURSE OUTCOMES

Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
25	M.Tech-Software Engineering	2025191100	Software Engineering	CO1	Analyze software development process models and their suitability to industrial applications.
				CO2	Develop SRS document for software design.
				CO3	Employ software architectural styles to design user interface.
				CO4	Compare software testing approaches and aspects.
25	M.Tech-Software Engineering	2025191101	Advanced Data Structures	CO1	Compare linear and non linear data structures
				CO2	Implement searching, sorting and traversing methods
				CO3	Implement priority queues using Binary heap
				CO4	Analyze algorithms for Height balanced trees like AVL trees, red-black trees, B-trees and Splay trees.
25	M.Tech-Software Engineering	2025191150	Software Project and Process Management	CO1	To understand the basic concepts and issues of software project management
				CO2	To conduct activities necessary to successfully complete and close the Software projects
				CO3	To implement the project plans through managing people, communications and change
				CO4	To develop the skills for tracking and controlling software deliverables
25	M.Tech-Software Engineering	2025191151	Machine Learning	CO1	Demonstrate on Supervised and Computational Learning
				CO2	Analyze on Statistics in learning techniques and Logistic Regression
				CO3	Illustrate on Support Vector Machines and Perceptron Algorithm
				CO4	Design a Multilayer Perceptron Networks and classification of decision tree
25	M.Tech-Software Engineering	2025191152	E-Commerce	CO1	Understand the basic concepts of E-commerce
				CO2	Demonstrate an retailing in E-commerce by using the effectiveness of market research
				CO3	Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra organizational
				CO4	Describe about Consumer Search and Resource Discovery
25	M.Tech-Software Engineering	2025191153	Software Quality Assurance and Testing	CO1	Describe various standards used for Software Quality Assurance
				CO2	Explain fundamental concepts in software quality (e.g., internal / external quality, as well as quality in use) and quality assurance models.
				CO3	Name and describe different testing techniques and approaches
				CO4	Compare various Automation tools used for Software Testing
25	M.Tech-Software Engineering	2025191154	Cloud Computing	CO1	Differentiate among various cloud offerings, cloud environments, distributed technologies
				CO2	Analyze various cloud platforms and cloud applications.
				CO3	Survey the policies and mechanisms for resource management, performance, scheduling
				CO4	Choose among different storage technologies for cloud like DFS, GFS, HDFS, S#, Big Table.
25	M.Tech-Software Engineering	2025191155	Internet of Things	CO1	Enumerate the list of IoT Applications
				CO2	Evaluate different IoT application architectures
				CO3	Construct IoT applications with Cloud for data analytics
				CO4	Chose a real world commercial platform for deploying IoT Applications
25	M.Tech-Software Engineering	2000191100	Research Methodology and IPR	CO1	Discuss the process used for research Problem selection and Research Paper Writing
				CO2	Interpret the Patent writing and Development
				CO3	Describe the Procedure for Grant of Patents
				CO4	Illustrate new Developments in IPR
25	M.Tech-Software Engineering	2025191110	Advanced Data Structures Lab	CO1	Identify classes, objects, members of a class and relationships among them needed for a specific
				CO2	Organize and apply to solve the complex problems using advanced data structures (like arrays,
				CO3	Apply and analyze functions of Dictionary
				CO4	Implement Programs on Hashing
25	M.Tech-Software Engineering	2025191111	SE LAB-I	CO1	Demonstrate the constructs of Ruby scripting Language, use of Perl language elements
				CO2	Implement PERL program to connect to MySQL database
				CO3	Implement Map Reduce Program for weather data
				CO4	Implement PHP program for cotactuspage.
25	M.Tech-Software	2000191130	Soft skills (Audit course)	CO1	**Teamwork** – learning to connect and work with others to achieve a set task.
				CO2	**Leadership** – assessing the requirements of a task, identifying the strengths within the team,
25	M.Tech-Software Engineering	2000191130	Disaster Management (Audit course)	CO1	learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian
				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
25	M.Tech-Software Engineering	2000191130	Pedagogy Studies (Audit course)	CO1	What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
				CO2	What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
				CO3	How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?
				CO4	
25	M.Tech-Software	2000191130	Stress Management	CO1	Develop healthy mind in a healthy body thus improving social health also
				CO2	Improve efficiency
25	M.Tech-Software Engineering	2025191200	Service Oriented Architecture	CO1	Creation of SOA compliant web service using various technologies.
				CO2	Make use of variousservice oriented analysis techniques also understand the technology underlying
				CO3	Demonstrate on basic concepts of SOA and it differs with other architectures
				CO4	Organize advanced concepts of service composition, Orchestration and Choreography.
25	M.Tech-Software Engineering	2025191201	Mathematical Foundations of Computer Science	CO1	Design mathematical logic with Propositional Calculus and Predicate Calculus.
				CO2	Assume mathematical principles and logics to solve real time problems.
				CO3	Apply graph theory for real time problems like network routing problem.
				CO4	Examine Principles of Inclusion–Exclusion, Pigeonhole Principle and its Application and Apply Recurrence Relations by Substitution and Generating Functions.
25	M.Tech-Software	2025191250	Software Testing	CO1	Examine Taxonomy of Bugs, Basics Concepts of Path Testing and theme of testing.
				CO2	Illustrate Domain testing and Interface Testing.

Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
[illegible]	[illegible] Engineering	[illegible]	[illegible] Methodologies	CO3	Organize Logic Based Testing, Graph Matrices and apply node reduction algorithm
				CO4	Identify the needs of software test automation and develop a test tool to support test automation.
25	M.Tech-Software Engineering	2025191251	Agile Software Development	CO1	Summarize the agile methodologies: extreme programming, scrum, and feature driven programming.
				CO2	Apply The Twelve XP Practices and Illustrate pair programming and its characteristics
				CO3	Apply XP to a small project.
				CO4	Examine Feature-Driven Development and Regaining Control
25	M.Tech-Software Engineering	2025191252	ERP & Supply Chain Management	CO1	Construct a model to generate forecasts for a company's products.
				CO2	Develop a Business Modules by using fundamentals Supply chain Management.
				CO3	Apply Supply chain strategies and list the performance Metrics.
				CO4	Develop an aggregate production plan with relevant deterministic and stochastic inventory models.
25	M.Tech-Software Engineering	2025191253	Secure Software Engineering	CO1	Explain the Properties of Secure Software and Specify Desired Security Properties.
				CO2	Incorporate requirements into secured software development process
				CO3	Apply secure design principles for developing attack resistant software
				CO4	Analyze the Security and complexity of system drivers.
25	M.Tech-Software Engineering	2025191254	Big Data Analytics	CO1	Illustrate on big data and its use cases from selected business domains.
				CO2	Interpret and summarize on No SQL, Cassandra
				CO3	Analyze the HADOOP and Map Reduce technologies associated with big data analytics and explore
				CO4	Make use of Apache Spark, RDDs etc. to work with datasets.
25	M.Tech-Software Engineering	2025191255	Design patterns	CO1	Identify the appropriate design patterns to solve object oriented design problems.
				CO2	Develop design solutions using creational patterns.
				CO3	Apply structural patterns to solve design problems.
				CO4	Construct design solutions by using behavioural patterns.
25	M.Tech-Software Engineering	2025191210	Software Testing Lab	CO1	Demonstrate a wide range of techniques including testing, test case coverage determination and
				CO2	Choose the existing testing techniques are most effective for vulnerability detection.
				CO3	Design test planning and Examine the test process
				CO4	Prepare test plan and develop test case hierarchy
25	M.Tech-Software Engineering	2025191211	SE Lab-II	CO1	Creating applications for Big Data analytics
				CO2	Building a complete business data analytic solution
				CO3	Understand how design patterns solve design problems
				CO4	Develop design solutions using creational patterns, structural and behavioural patterns
25	M.Tech-Software Engineering	2025191270	Constitution of India (Audit Course)	CO1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
				CO2	Understand state and central policies, fundamental uties.
				CO3	Understand Electoral Process, special provisions.
				CO4	Understand powers and functions of Municipalities, Panchayats and Cooperative Societies
25	M.Tech-Software Engineering	2025191270	Sanskrit For Technical Knowledge	CO1	Understanding basic Sanskrit language
				CO2	Ancient Sanskrit literature about science & technology can be understood Being a logical language will help to develop logic in
25	M.Tech-Software	2025191270	Value Education	CO1	Knowledge of self-development
				CO2	Learn the importance of Human values 3.Developing the overall personality
25	M.Tech-Software	2025191270	Personality Development	CO1	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the
				CO2	The person who has studied Geeta will lead the nation and mankind to peace and prosperity Study of
25	M.Tech-Software Engineering	2000191230	Mini Project with Seminar	CO1	Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of computer science and engineering.
				CO2	Simulate and analyze the results reported in the chosen paper for seminar topic.
				CO3	Communicate effectively before the expert panel and develop technical reports.
				CO4	Respond to the queries raised by the evaluation committee and audience
25	M.Tech-Software Engineering	2025192150	Object Oriented Software Engineering	CO1	Analyze of a formally specified problem statement with Modeling Concepts.
				CO2	Examine Project Organization, Communication and analysis Concepts.
				CO3	Produce appropriate System Design, object design of reusable Activities
				CO4	Apply skills relevant for Mapping Models to Code, Configuration and project Management
25	M.Tech-Software Engineering	2025192151	Artificial Intelligence	CO1	Select a search algorithm for a problem and characterize its time and space complexities.
				CO2	Experiment with knowledge using the appropriate techniques for Logic concepts
				CO3	Develop knowledge representation using semantic network, semantic web and List advanced
				CO4	Apply AI techniques to solve problems of Expert Systems
25	M.Tech-Software Engineering	2025192160	MOOCS	CO1	Connect openly on a global scale, with global learners and instructors.
				CO2	Develop high quality learning using multimedia platform.
				CO3	Self assessment of their performance and learning process.
				CO4	Develop a lifelong learning culture and updating the knowledge according with emerging trends.
25		2025192152	User Interface Design	CO1	Analyze a user interface from a communication perspective with graphical user interface.
				CO2	Discuss the nature of the design process.
				CO3	Select an appropriate interaction design pattern for Screen Designing.
				CO4	Demonstrate on selection of window and Components.
25	M.Tech-Software Engineering	2025192170	Dissertation-I	CO1	apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint.
				CO2	Ability to perform individually accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success
				CO3	Ability to use formal and informal communications with guide, make presentations and prepare technical document.
				CO4	Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems
25	M.Tech-Software Engineering	2025192270	Dissertation-II	CO1	apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint.
				CO2	Ability to perform individually accepting responsibility, taking initiative, and providing leadership, necessary to [illegible] process
				CO3	Ability to [illegible] communications with guide, make presentations and prepare technical [illegible]
				CO4	Develop/[illegible] with appropriate techniques, resources and contemporary tools for social relavent [illegible] problems

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

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

16	22	M.Tech-Transportation Engineering	2022191251	Pavement Construction	CO2	Understand mix design, construction control and quality control checks of stabilised pavement layers.
	22	M.Tech-Transportation Engineering			CO3	Understand the structural and function failures and evaluation of pavements
	22	M.Tech-Transportation Engineering			CO4	Develop pavement management systems.
17	22	M.Tech-Transportation Engineering	2022191252	Aviation Infrastructure and Planning	CO1	Demonstrate the clear understanding of the airport components
	22	M.Tech-Transportation Engineering			CO2	Build knowledge on basic principles in airport components, geometric design and delays
	22	M.Tech-Transportation Engineering			CO3	Build knowledge on critical factors consideration in airport grading and design.
	22	M.Tech-Transportation Engineering			CO4	Develop Knowledge on air traffic control aids.
18	22	M.Tech-Transportation Engineering	2022191253	Port and Harbour Engineering	CO1	Develop an understanding of overall Port and Harbour Engineering and its impact.
	22	M.Tech-Transportation Engineering			CO2	Build knowledge on the Key design Characteristics for design of Elements like Groins, Breakwaters
	22	M.Tech-Transportation Engineering			CO3	Extend knowledge on flow regime, lift force mechanism, bed load and suspended load and other
	22	M.Tech-Transportation Engineering			CO4	Assess the design principles and construction of jetties along with desing of off shore structures
19	22	M.Tech-Transportation Engineering	2022191254	Sustainable Urban and Transport Development	CO1	Understand the importance of sustainable urban and transport planning
	22	M.Tech-Transportation Engineering			CO2	Understand the sustainable urban and transport planning techniques
	22	M.Tech-Transportation Engineering			CO3	Understand the benefits of human community
	22	M.Tech-Transportation Engineering			CO4	Evaluate the economic, financial and pricing of sustainiable transport
20	22	M.Tech-Transportation Engineering	2022191255	Environmental Impact Assessment	CO1	Able to prepare and evaluate EIA reports
	22	M.Tech-Transportation Engineering			CO2	Identify risks and impacts of the projects
	22	M.Tech-Transportation Engineering			CO3	Selection of an appropriate EIA methodology
	22	M.Tech-Transportation Engineering			CO4	Estimate the cost benefit ratio of the project.
21	22	M.Tech-Transportation Engineering	2022191210	Traffic Engineering Laboratory	CO1	Analyze the traffic flow and parking characteristics
	22	M.Tech-Transportation Engineering			CO2	Determine the capacity and saturation flow of the road network.
	22	M.Tech-Transportation Engineering			CO3	Design traffic signal contral system for given intersection.
	22	M.Tech-Transportation Engineering			CO4	Develop Knowledge on to solve complex traffic problems with definite solutions.
22	22	M.Tech-Transportation Engineering	2022191211	Transportation Simulation Lab	CO1	Build knowledge on quality behavior of hetrogenous traffic flow.
	22	M.Tech-Transportation Engineering			CO2	Develop simulation models for various traffic and geometric conditions in Indian conditions.
	22	M.Tech-Transportation Engineering			CO3	Interprit the simulation to find suitable solutions.
	22	M.Tech-Transportation Engineering			CO4	Apply simlulation results to plan and design complex transportation network.
23	22	M.Tech-Transportation Engineering	2000191230	Constitution of India	CO1	Understand historical background of the constitution making and its importance for building a democratic
	22	M.Tech-Transportation Engineering			CO2	Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
	22	M.Tech-Transportation Engineering			CO3	Familiarise the value of the fundamental rights and duties for becoming good citizen of India.
	22	M.Tech-Transportation Engineering			CO4	Analyze the decentralization of power between central, state and local self-government.
24	22	M.Tech-Transportation Engineering	2022191270	Mini Project with Seminar	CO1	Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to idenitfy solutions
	22	M.Tech-Transportation Engineering			CO2	Determine suitable methodology to attain at a sustainable solutions for the identified problems.
	22	M.Tech-Transportation Engineering			CO3	Design, implement, and optimize the solution to meet all the feasible requirements.

	22	M.Tech-Transportation Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.
25	22	M.Tech-Transportation Engineering	2022192150	Finacial and Ecoomic Analysis of trnasportation Porjects	CO1	Understand the concepts of decision making
	22	M.Tech-Transportation Engineering			CO2	Calculate transportation demand and supply with estimation of vehicle operating cost and accident cost
	22	M.Tech-Transportation Engineering			CO3	Perform economic analysis of transportation project
	22	M.Tech-Transportation Engineering			CO4	Applying varies financial methods in road projects.
26	22	M.Tech-Transportation Engineering	2022192151	Highway Safety Engineering	CO1	Understand causes of accidents and carryout statistical analysis of accident data.
	22	M.Tech-Transportation Engineering			CO2	Apply road safety technique in the construction of new roads.
	22	M.Tech-Transportation Engineering			CO3	Explain road reconstruction principle and improvement of road considering the different components of road and intersections.
	22	M.Tech-Transportation Engineering			CO4	Emphasize on road safety auditing principle and procedures; analyse the effectiveness of various traffic management techniques.
27	22	M.Tech-Transportation Engineering	2022192152	Computational Techniques in Transportation Engineering	CO1	Understand the introdcution to systems approach
	22	M.Tech-Transportation Engineering			CO2	A working knowledge of simulation and GPSS programming
	22	M.Tech-Transportation Engineering			CO3	A good understanding of GA applications
	22	M.Tech-Transportation Engineering			CO4	The ability to apply ANN
28	22	M.Tech-Transportation Engineering	2022192160-A	Waste water Management	CO1	Distinguish between the quality of domestic and industrial water requirements and wastewater quantity
	22	M.Tech-Transportation Engineering			CO2	Impart knowledge on selection of treatment methods for industrial wastewater.
	22	M.Tech-Transportation Engineering			CO3	Describe the common methods of treatment in different industries
	22	M.Tech-Transportation Engineering			CO4	Design of wastewater treatment plant for the given sewage characteristics
29	22	M.Tech-Transportation Engineering	2022192160-B	Environmental Impact Assessment	CO1	Understand evaluate and create the basic concept of environmental impact assessment, Flow of EIA, Types of environmental Impacts
	22	M.Tech-Transportation Engineering			CO2	Implement different methods in preparing an Environmental Impact Statement
	22	M.Tech-Transportation Engineering			CO3	Identify various mitigation measures that can be used.
	22	M.Tech-Transportation Engineering			CO4	Access environmental impacts and indicate their potential risks through environmental indices and
30	22	M.Tech-Transportation Engineering	2022192170	Dissertation –I/Industrial Project	CO1	Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to idenitfy solutions
	22	M.Tech-Transportation Engineering			CO2	Determine suitable methodology to attain at a sustainable solutions for the identified problems.
	22	M.Tech-Transportation Engineering			CO3	Design, implement, and optimize the solution to meet all the feasible requirements.
	22	M.Tech-Transportation Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.
31	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
	22	M.Tech-Transportation Engineering			CO2	Determine suitable methodology to attain at a sustainable solutions for the identified problems.
	22	M.Tech-Transportation Engineering			CO3	Design, implement, and optimize the solution to meet all the feasible requirements.
	22	M.Tech-Transportation Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.

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	VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)					
	DEPARTMENT OF MASTER OF BUSINESS ADMINISTRATION					
	VR19- COURSE OUTCOMES					
S NO	Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
1	1 E-00	MBA-Master of Business Administration	3099191100	Principles of Management	CO1	Extract Managerial skills of the students
					CO2	Identify the external and internal factors that influence on organizational structure behaviors
					CO3	Analyze how an organization's leaders/managers utilize job design, positional power, and goal setting/performance management to motivate employees.
					CO4	Discuss leadership characteristics that produce high performing organizations.
2	1 E-00	MBA-Master of Business Administration	3099191101	Managerial Economics	CO1	Identify the objectives, nature, scope, role & responsibilities of a manager of a business undertaking.
					CO2	Predict the demand for a product or product mix of a company & to analyze various factors influencing demand elasticity.
					CO3	Examine optimum production & cost functions with the help of mathematical equations & by developing graphical solutions through linear programming applications.
					CO4	Discuss the concept of equilibrium price and output in different market situations i.e., perfect, monopoly, monopolistic & Oligopoly competition with the help of graphs.
3	1 E-00	MBA-Master of Business Administration	3099191102	Accounting for Managers	CO1	Identify the types of Accounts and Principles.
					CO2	Prepare Financial Statement.
					CO3	Analyze the Financial Position of the Organization.
					CO4	Evaluate Cost and Cost behaviour.
4	1 E-00	MBA-Master of Business Administration	3099191103	Managerial Communication & Soft Skills	CO1	Discuss communication theories.
					CO2	Display Verbal and Non-Verbal Communication
					CO3	Develop Presentation Skills
					CO4	Design Business Report.
5	1 E-00	MBA-Master of Business Administration	3099191104	Business Environment	CO1	Interpret business environment and its impact
					CO2	Discuss the comprehensive structure of Indian economy
					CO3	Debate on various Policies
					CO4	Analyze the legal Regulations pertaining to business environment
6	1 E-00	MBA-Master of Business Administration	3099191105	Operations Research for Business Decision	CO1	Calculate descriptive statistical measures and appreciate the uses and limitations of the measures.
					CO2	Formulate basic concepts of probability and theoretical probability (binomial, normal but not poisson) distributions.
					CO3	To solve a simple ordinary least squares regression model with one explanatory variable, apply the model, and calculate the correlation coefficient between two variables.
					CO4	Apply quantitative models (linear programming and network analysis) at an introductory level, with emphasis on relevant data and the limitations of the techniques.
7	1 E-00	MBA-Master of Business Administration	3099191110	Information Technology Lab	CO1	Identify the softwares required for analysis.
					CO2	Apply the Financial Modelling Techniques.
					CO3	Evaluate data using statistical techniques.
					CO4	Design the presentation using charts.
8	1 E-00	MBA-Master of Business Administration	3099191180	Employability Skills-I	CO1	Application of consumer behavior in marketing
					CO2	Analyze Individual and group determinants of consumer behavior
					CO3	Evaluate Environmental influences on consumer behavior

					CO4	Analyze Consumer decision making process
9	1 E-00	MBA-Master of Business Administration	3099191200	Financial Management	CO1	Identify the sources of Finance.
					CO2	Evaluate Profitable Investment Proposals.
					CO3	Analyze proportions of Retention and Dividend Payout Ratio.
					CO4	Design Credit Policies for Business.
10	1 E-00	MBA-Master of Business Administration	3099191201	Human Resource Management	CO1	Identify the roles of HR Manager.
					CO2	Interpret current trends and practices in the field of HR
					CO3	Evaluate employee performance and organizational effectiveness
					CO4	Design Compensation system for an organization.
11	1 E-00	MBA-Master of Business Administration	3099191202	Marketing Management	CO1	Identify core concepts of marketing and the role of marketing in business and society
					CO2	Apply the Segmentation, Targeting and Positioning.
					CO3	Create an integrated marketing communications plan.
					CO4	Analyze marketing problems and implement marketing plans.
12	1 E-00	MBA-Master of Business Administration	3099191203	Production and Operations Management	CO1	Identify the core features of the operations and production management.
					CO2	Interpret the various parts of the operations and production management processes.
					CO3	Develop an integrated framework for strategic thinking and decision making.
					CO4	Illustrate operational methodologies to assess and improve an organizations performance.
13	1 E-00	MBA-Master of Business Administration	3099191204	Business Research Methodology	CO1	Discuss the major types of Research and designs.
					CO2	Formulate Research problems and measurements.
					CO3	Interpret Research reports.
					CO4	Caluculate Business Problems using appropriate methods.
14	1 E-00	MBA-Master of Business Administration	3099191205	Organizationa l Behaviour	CO1	Identify the roles and responsibilities of Organizational Behaviour.
					CO2	Display Leadership skills in an Organization.
					CO3	Analyze behavioural dimensions.
					CO4	Apply Interpersonal Communcation skills for Team Building.
15	1 E-00	MBA-Master of Business Administration	3099191270	Mini Project	CO1	Conduct field survey on society/corporate/business/government/NGO.
					CO2	Apply the theortical concept
					CO3	Analyze and interpret the data
					CO4	Prepare and present the report
16	1 E-00	MBA-Master of Business Administration	3099191280	Employability Skills-II	CO1	Identify the importance of Comprehension & Speech Fluency
					CO2	Display of Time Management Skills
					CO3	Interpret ideas and information
					CO4	Development of writen and oral communication
17	1 E-00	MBA-Master of Business Administration	3099192100	Strategic Management	CO1	Identify the practical and integrative model of strategic management.
					CO2	Apply the Environmental Scanning Techniques
					CO3	Analyze the formulation and structure of Organizational Strategy.
					CO4	Design the Organizational Strategy.
18	1 E-00	MBA-Master of Business Administration	3099192101	Legal Aspects Of Business	CO1	Outline the Indian Contract Act.
					CO2	Identify the rights of Unpaid Seller.
					CO3	Discuss various aspects of Negotiable Instruments and Companies Act.
					CO4	Debate on various Cyber Laws.
19	1 E-00	MBA-Master of Business Administration	3099192102	Business Ethics & Corporate Governance	CO1	Identify the role of Ethical Values of an Organization.
					CO2	Debate the global perspective of Unethical practices.
					CO3	Discuss the Ethical practices in Functional areas.
					CO4	Relate the role of Corporate Governance practices in Indian Industries.
20	1 E-00	MBA-Master of Business	3099192150	Product Management	CO1	Infer the basic concepts of Product.
					CO2	Design Development of New Product.

20	1 E-00	of Business Administration	3099192150	Management (Marketing)	CO3	Build the brand positioning.
					CO4	Discuss the Channels of Distribution and Packaging.
21	1 E-00	MBA-Master of Business Administration	3099192151	Promotion And Distribution Management (Marketing)	CO1	List out the various concepts of Promotion and Distribution.
					CO2	Outline the challenges of Distibution System.
					CO3	Discuss the various Channels of Distribution.
					CO4	Debate the various ethical and social issues in Distribution Management.
22	1 E-00	MBA-Master of Business Administration	3099192152	Investment Analysis And Portfolio Management (Fin)	CO1	Identify different segments of Financial Markets.
					CO2	Evaluation of various Asset Valuation Models.
					CO3	Apply various Investment Analysis Tools.
					CO4	Adopt and apply portfolio evaluation models for the realistic situations
23	1 E-00	MBA-Master of Business Administration	3099192153	Banking And Insurance (Fin) (Elective)	CO1	Identify the fundamental concepts of Banking System in India.
					CO2	Discuss the various types of Banking Funds.
					CO3	Evaluate the latest regulations and innovations in Banking.
					CO4	Analyze the LIC and GIC.
24	1 E-00	MBA-Master of Business Administration	3099192154	Compensation And Performance Management (Hr) (Elective)	CO1	Discuss concepts of compensation and designing of effective compensation system.
					CO2	List out various Wage payment systems.
					CO3	Evaluate administration of wage and salary.
					CO4	Analyze effectiveness of performance management in an organization.
25	1 E-00	MBA-Master of Business Administration	3099192155	Management Of Industrial Relations (Hr) (Elective)	CO1	Identify the essential concepts of industrial relations.
					CO2	Discuss the Trade Unions and Work-Life Balance.
					CO3	Design the Wage and Salary Administration.
					CO4	Interpret and Solve the Grievances in Industries.
26	1 E-00	MBA-Master of Business Administration	3099192170	Case Study	CO1	Conduct field survey on society/corporate/business/government/NGO.
					CO2	Apply the theortical concept
					CO3	Analyze and interpret the data
					CO4	Prepare and present the report
27	1 E-00	MBA-Master of Business Administration	3099192180	Employability Skills-III	CO1	Discuss and discover barriers to effective communication techniques.
					CO2	Develop effective writing skills in academic and professional contexts.
					CO3	Make Use English language in business communication
					CO4	demostrate skills in listening comprehension, GDs and Interview.
28	1 E-00	MBA-Master of Business Administration	3099192200	Logistic and Supply Chain Management	CO1	Acquires knowledge of the functional components within logistics to the interrelationships in the integrated supply chain.
					CO2	Analyze the difference between logistics and supply chain management & gain knowledge on Benchmarking.
					CO3	Evaluate warehousing and transportation options and recommend appropriate solutions for business requirement
					CO4	Make use of technology in logistics and supply chain management.
29	1 E-00	MBA-Master of Business Administration	3099192201	Entrepreneur ship Development	CO1	Discuss Growth and Importance of Entrepreneurship
					CO2	Explain the concept of entrepreneurship and Women entrepreneurship
					CO3	Extract the essence of entrepreneurial motivation
					CO4	Elucidate the problems of women entrepreneurship
30	1 E-00	MBA-Master of Business Administration	3099192250	Services Marketing (MARKETIN G)	CO1	Discuss concepts and components of Services Marketing
					CO2	Identify key dimensions of Services Marketing
					CO3	Develop service marketing mix strategies
					CO4	Evaluate the behavior of the customer and the strategies to retain them.

31	1 E-00	MBA-Master of Business Administration	3099192251	Consumer Behavior (MARKETING)	CO1	Discuss consumer behavior, models and learning process.
					CO2	Analyze consumer attitude formation, change and consumer communication.
					CO3	Identify psychological factors affecting consumer behavior and post purchase process.
					CO4	Create awareness about consumerism and consumer protection acts.
32	1 E-00	MBA-Master of Business Administration	3099192252	International Financial Management (FIN) (ELECTIVE)	CO1	Demonstrate the understanding of international financial theory
					CO2	Illustrate applications pertaining to exchange rate determinants.
					CO3	Develop a frame of reference through which to identify, evaluate, and solve problems pertaining to international financial management.
					CO4	Interpret the international taxation methods and management of External Indebtness.
33	1 E-00	MBA-Master of Business Administration	3099192253	Financial Risk Management (FIN)	CO1	Discuss risk management concepts in present business situations.
					CO2	Evaluate financial risk measurement methods
					CO3	Demonstrate financial risk measurement tools
					CO4	Apply advanced financial risk management techniques
34	1 E-00	MBA-Master of Business Administration	3099192254	Global Human Resource Management (HR) (ELECTIVE)	CO1	Demonstrate across a broad knowledge of HRM strategies, Policies and practices across a range of cultural and nations.
					CO2	Differentiate intentional and domestic dimension of the operational aspects of HRM.
					CO3	Discuss the concepts of expatriation
					CO4	To analyze and apply international HRM concepts in relation to global ethical issues in the work place
35	1 E-00	MBA-Master of Business Administration	3099192255	Management of Change and Development (HR)	CO1	Discuss the relevance of change management approaches and models to a variety of situations where appropriate
					CO2	Identify range of skills relevant to the change management process
					CO3	Articulate management competencies in Organizational Development
					CO4	Apply tools and models to explore underlying organizational and behavioural issues that may affect the change process
36	1 E-00	MBA-Master of Business Administration	3099192256	MOOCs	CO1	Connect openly on a global scale, with global learners and Instructors
					CO2	platform
					CO3	Self assesment of their performance and learning process.
					CO4	Adapt a life long learning culture and updating the knowledge according with emerging trends
37	1 E-00	MBA-Master of Business Administration	3099192270	Major Project & Comprehensive Viva	CO1	Conduct field survey on society/corporate/business/government/NGO.
					CO2	Apply the theortical concept
					CO3	Analyze and interpret the data
					CO4	Prepare and present the report
38	1 E-00	MBA-Master of Business Administration	3099192280	Employability Skills-IV	CO1	Develop value based leadership
					CO2	Analyze and effective communication in the aspects of business.
					CO3	Apply the knowledge of effective writing skills in business context.
					CO4	Critical thinking abilities for decision making.

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VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY

DEPARTMENT OF MCA

VR19 - COURSE OUTCOMES

SNO	Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
1	1F-00	MCA-Master of Computer Application	4010191101	C Programming and Data Structures	CO1	Analyze problems and develop solutions by writing algorithms.
					CO2	Design various dynamic allocation memory programs.
					CO3	Develop simple real-time applications to get familiarity of the
					CO4	queue, tress and graphs
2	1F-00	MCA-Master of Computer Application	4010191102	Digital Computer Fundamentals	CO1	Identify the logic gates and their functionality.
					CO2	Perform number conversions from one system to another system.
					CO3	Design basic electronic circuits (combinational circuits).
					CO4	Perform a comparative analysis of the components of different
3	1F-00	MCA-Master of Computer Application	4010191103	Discrete Mathematical Structures and Graph Theory	CO1	verify the consistence of data.
					CO2	Construct Hasse diagram and Understand concept of recursive
					CO3	Understand different counting techniques.
					CO4	Apply different methods to solve homogeneous and non-
					CO5	Apply graph theory concepts in core subjects such as data structures and network theory effectively.
4	1F-00	MCA-Master of Computer Application	4010191104	Accounting and Financial Management	CO1	To identify the need and the role of accounting in present modern
					CO2	To have capabilities to preparation of trail balance – Final accounts.
					CO3	Financial management role and objectives of the business.
					CO4	To explain the Importance of the cost behavior
					CO5	Use of the standard costing and budgeting in present business level.
5	1F-00	MCA-Master of Computer Application	4010191105	Professional Communication	CO1	The students will be able to read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources,
					CO2	The students will be able to analyze the functions of language and grammar in spoken and written forms.
					CO3	The students will be able to write effectively on various domains.
					CO4	The students will be able to prepare and exhibit oral presentation skills by using ICT.(Individual/Team)
6	1F-00	MCA-Master of Computer Application	4010191121	English Language Communication Skills Lab	CO1	Use English language fluently, accurately and appropriately.
					CO2	Demonstrate skills in Reading, listening comprehension, GDs and Int
					CO3	Read and answer questions (orally and in writing) based on passages.
					CO4	Show effective writing skills in academic and professional contexts.
7	1F-00	MCA-Master of Computer Application	4010191122	C Programming and Data Structures Lab	CO1	Able to write programs in C Language
					CO2	Develop logical and analytical thinking in C
					CO3	Knowledge in writing programs in various concepts like arrays, functions, pointer etc.
					CO4	How to read and write contents from or into a file
8	1F-00	MCA-Master of Computer Application	4010191123	IT Workshop Lab	CO1	Identify the basic peripherals, assembling a Personal Computer, Installation of system software like MS Windows, device drivers.
					CO2	Troubleshoot Hardware and software.
					CO3	home and workplace effectively, Usage of the internet, web browsers, email, newsgroups and discussion forums.
					CO4	computer from getting infected with viruses), worms and other cyber-attacks.
					CO5	point presentations and personal web sites using the Microsoft suite of office tools.
9	1F-00	MCA-Master of Computer Application	4010191201	OOPS Through JAVA	CO1	Apply OOP concepts and basics of Java programming.
					CO2	Use the concepts of Java programming in problem solving.
					CO3	Extend the knowledge of Java programming in developing futuristic
10	1F-00	MCA-Master of Computer Application	4010191202	Operating Systems	CO1	Apply optimization techniques for the improvement of system
					CO2	Design and solve synchronization problems.
					CO3	Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput by keeping CPU
					CO4	Change access controls to protect files.
					CO5	Analyze the different operating systems.
11	1F-00	MCA-Master of Computer Application	4010191203	Software Engineering	CO1	Prepare a Software Requirement Specification (SRS) document for
					CO2	Identify the importance of system analysis and design in solving
					CO3	Distinguish between object-oriented approach and traditional approach in system analysis and design.
					CO4	Analyze various metrics to measure software product size and
12	1F-00	MCA-Master of Computer Application	4010191204	Operations Research	CO1	Analyze Different transportation models
					CO2	Design inventory and queueing theroy models for optimal decisions
					CO3	programming and game theory
					CO4	understand the basic s of Computer Graphics
					CO1	give a description of the Architecture of Database Management Systems

13	1F-00	MCA-Master of Computer Application	4010191205	Database Management Systems	CO2	understand the applications of Databases and functions of DBA
					CO3	know the advantages and disadvantages of the different models
					CO4	compare relational model with the structured query language (SQL)
					CO5	know the various constraints associated with relational database
					CO6	know the rules guiding transaction ACID
					CO7	understand the concept of data planning and database design
14	1F-00	MCA-Master of Computer Application	4010191221	OOPS Through JAVA Lab	CO1	write simple programs in Java Language
					CO2	Develop logical and analytical thinking in Java
					CO3	Knowledge in writing programs in various concepts like Exception Handling, applets, swings etc.
					CO4	Design to read and write contents from or into a file
15	1F-00	MCA-Master of Computer Application	4010191222	Database Management Systems Lab	CO1	Demonstrate knowledge of artistic and design components that are used in the creation of a web site
					CO2	Utilize and apply the technical, ethical and interpersonal skills needed to function in a cooperative environment
					CO3	Experiment Unix utilities and perform basic shell control of the
					CO4	Create effective file access control methods for handling Unix file
16	1F-00	MCA-Master of Computer	4010191223	Operating System Lab	CO1	for deadlock avoidance
					CO2	for deadlock prevention.
17	1F-00	MCA-Master of Computer Application	4010192101	Advanced Java & Web Technologies	CO1	Implement web based applications using features of HTML.
					CO2	Develop reusable component for Graphical User Interface
					CO3	Apply the concepts of server side technologies for dynamic web
					CO4	Implement the web based applications using effective data base access with rich client interaction.
18	1F-00	MCA-Master of Computer Application	4010192102	Object Oriented Analysis and Design	CO1	Possess an ability to practically apply knowledge software engineering methods, such as object-oriented analysis and design
					CO2	Have a working ability and grasping attitude to design and conduct object-oriented analysis and design experiments using UML, as well
					CO3	Display an ability to identify, formulate and solve software development problems: software requirements, specification (problem space), Software design, and implementation (solution
					CO4	Show an ability to use the graphical UML representation using tools, such as IBM's Rational Rose or Microsoft's Vision.
19	1F-00	MCA-Master of Computer Application	4010192103	UNIX Programming	CO1	Understand Fundamental Network Design Principles
					CO2	Understand All the Unix Utilities, and Implement Shell Scripting
					CO3	Differentiate Connection Oriented and Connection less Network
					CO4	Understands the Concept of Process Threads and File Structure
					CO5	Design Various Client Server Applications Using TCP or UDP
20	1F-00	MCA-Master of Computer Application	4010192104	Principles and Practices of Management	CO1	Understand what is management and evolution of management thoug
					CO2	Importance of planning and decision making in organizations
					CO3	Process of organizing and delegation of authority
					CO4	Theories of motivation and leadership styles
					CO5	Coordination and control process in the organizations
1	1F-00	MCA-Master of Computer Application	4010192105	Design and Analysis of Algorithms	CO1	Basic data structure and it working topological design.
					CO2	Basic functionality of different type of algorithms and its usage
					CO3	Analysis of different type of complexity and its applicable condition
					CO4	Able to design algorithm
22	1F-00	MCA-Master of Computer Application	4010192121	Advanced Java & Web Technologies Lab	CO1	Implement sophisticated Java applications and well-organized, complex computer programs with both command line and graphical
					CO2	Learn to access database through Java programs, using Java Data Base Connectivity (JDBC).
					CO3	Create dynamic web pages, using Servlets and JSP & make a reusable software component, using Java Bean.
					CO4	Understand the multi-tier architecture of web-based enterprise
23	1F-00	MCA-Master of Computer Application	4010192122	Object Oriented Analysis and Design Lab	CO1	Understand the Case studies and design the Model.
					CO2	Understand how design patterns solve design problems.
					CO3	Develop design solutions using creational patterns.
					CO4	Construct design solutions by using structural and behavioral pattern:
24	1F-00	MCA-Master of Computer Application	4010192123	UNIX Programming Lab	CO1	UNIX/LINUX Operating System (We will be using Ubuntu flavor of the Linux operating system).
					CO2	You will be able to run C / C++ programs on UNIX.
					CO3	You will be able to do shell programming on UNIX OS.
					CO4	You will be able to understand and handle UNIX system calls
25	1F-00	MCA-Master of Computer Application	4010192201	Computer Networks	CO1	Students will able to understand the network topology and its
					CO2	Students will able to understand different types of network
					CO3	Students will able design new routing technique base on exiting
					CO4	Students will able to understand the application of networks in MANETS, Adhoc Networks, Wireless Sensors network etc.
		MCA-Master of			CO1	Construct Software easily right out of the box

26	1F-00	MCA-Master of Computer Application	4010192202	Python Programming	CO2	Experiment with an interpreted Language
					CO3	Build software for real needs
					CO4	Explain to testing Orielly
27	1F-00	MCA-Master of Computer Application	4010192203	Data warehousing and Mining	CO1	Ability to identify, understand and investigate various patterns that can be extracted from different types of data.
					CO2	Apply various pre-processing techniques and classification algorithms on different domains of data
					CO3	Build decision making systems using data mining algorithms for a
					CO4	Construct models using modern tools such as WEKA, R and python
28	1F-00	MCA-Master of Computer Application	4010172404	Statistical Programming with R	CO1	Understand the basics of R programming
					CO2	Knowledge on R programming control statements
					CO3	Knowledge on Graphics
					CO4	Awareness on statistical concepts
29	1F-00	MCA-Master of Computer Application	4010172405	Network Programming	CO1	Ability to understand and reason out the working of network Systems
					CO2	To teach students the use of basic socket programming Utilities.
					CO3	To teach students the principles of socket programming
					CO4	To familiarize students with the concepts, design, and structure of the TCP/UDP programming.
					CO5	To be able to build an application of UNIX programming in socket.
30	1F-00	MCA-Master of Computer Application	4010172406	Cloud Computing	CO1	Understand the systems, protocols and mechanisms to support cloud
					CO2	Develop applications for cloud computing by using platforms and
					CO3	Understand the hardware requirements for cloud computing.
					CO4	Understand the cloud security risks
31	1F-00	MCA-Master of Computer Application	4010172407	Software Project Management	CO1	Basic Knowledge on software Engineering
					CO2	Basic knowledge on project goals
					CO3	Implement basic AI algorithms
32	1F-00	MCA-Master of Computer Application	4010172408	Artificial Intelligence	CO1	Describe the modern view of AI as the study of agents that receive percepts and perform Actions
					CO2	Apply AI search Models and Generic Search strategies
					CO3	Inspect and analyze Logic for representing Knowledge and Reasoning of AI systems.
					CO4	Evaluate the searching strategies for given situation to achieve the goal.
					CO5	Design different learning algorithms for improving the performance of AI systems.
					CO6	Conduct investigation and implement projects using different AI learning techniques
33	1F-00	MCA-Master of Computer Application	4010172409	Mobile Application Development	CO1	Get familiarity with the Android operating system development environment.
					CO2	Create user-friendly mobile user interfaces and views.
					CO3	Develop basic Android applications for mobiles.
34	1F-00	MCA-Master of Computer Application	4010192221	Python Programming Lab	CO1	understand and reason out the working of network Systems
					CO2	Implement basic socket programming Utilities
					CO3	familiarize students with the concepts, design, and structure of the
					CO4	build an application of UNIX programming in socket
35	1F-00	MCA-Master of Computer Application	4010192222	Data Warehousing and Mining Lab	CO1	Construct Software easily right out of the box
					CO2	Experiment with an interpreted Language
					CO3	Build software for real needs
					CO4	develop database applications in Python
36	1F-00	MCA-Master of Computer Application	4010192223	Soft Skills Lab	CO1	Use English language fluently, accurately and appropriately.
					CO2	Discuss and discover barriers to effective communication.
					CO3	Demonstrate skills in listening comprehension, GDs and Interview.
					CO4	Read and answer questions (orally and in writing) based on
					CO5	Show effective writing skills in academic and professional contexts
37	1F-00	MCA-Master of Computer Application	4010192231	Mini Project/ Online Certification Course form	CO1	Develop skills in distinguishing various types of computer crimes
					CO2	Illustrate how to apply different forensic analysis tools to recover
					CO3	Explain about threats and compare various threats.
					CO4	Summarize the need for surveillance and list the tools used
38	1F-00	MCA-Master of Computer Application	4010193101	Big Data Analytics	CO1	Preparing for data summarization, query, and analysis.
					CO2	Applying data modeling techniques to large data sets
					CO3	Creating applications for Big Data analytics
					CO4	Building a complete business data analytic Solution
39	1F-00	MCA-Master of Computer Application	4010193102	Internet of Things	CO1	Understand the IOT connectivity principles and application areas.
					CO2	Conceptually identify revolution of IOT in cloud, wireless sensors including recent attacks involving the Internet of Things.
					CO3	Build a real time IOT application.
40	1F-00	MCA-Master of Computer Application	4010193103	Cryptography and Network Security	CO1	Understand the concepts of need of security in real time applications
					CO2	To analyze the use of different security techniques in diverse applications
					CO3	Students will get the knowledge of advance security algorithm with respect
					CO4	possible solutions

41	1F-00	MCA-Master of Computer Application	4010173504	Cyber Security	CO1	Understand the basics Concepts of Cyber threats and security with
					CO2	Students will get the Knowledge of Cyber forensic standard procedures
					CO3	To get the knowledge the cyber threats and cyber law
					CO4	To understand the specific circumstances of cyber threats
42	1F-00	MCA-Master of Computer Application	4010173505	Advanced Mobile Application Development	CO1	Create Image Gallery for online Shopping in Grid view.
					CO2	Create menus for any one standard mobile application.
					CO3	Database.
					CO4	Implement an Android program for HTTP Connection
					CO5	Design and develop simple charting mobile app using socket programming
					CO6	Create the APK file for all the above mobile experiments and create signature certificates
43	1F-00	MCA-Master of Computer Application	4010173506	E-Commerce	CO1	To know and understand the critical success factors in implementing
					CO2	To know how to plan and how to manage e-commerce solutions.
					CO3	To apply processes of e-commerce.
					CO4	environment associated with e-commerce.
44	1F-00	MCA-Master of Computer Application	4010173507	Web Scripting Through PHP & MYSQL	CO1	To know how to use technologies to build e-commerce websites.
					CO2	Work with HTML forms and handling HTML forms using PHP
					CO3	Familiar with MYSQL database and perform insert, update and
					CO4	Implement and debug programs in PHP and MYSQL for a specific application.
45	1F-00	MCA-Master of Computer Application	4010173508	Multimedia Application Development	CO1	To learn and understand technical aspect of Multimedia Systems.
					CO2	To understand the standards available for different audio, video and text applications.
					CO3	To Design and develop various Multimedia Systems applicable in real time.
					CO4	To learn various multimedia authoring systems.
					CO5	To understand various networking aspects used for multimedia applications.
					CO6	To develop multimedia application and analyze the performance of the same.
46	1F-00	MCA-Master of Computer Application	4010173509	Human Computer Interaction	CO1	Design and Development processes and life cycle of Human Computer Interaction
					CO2	Analyze product usability evaluations and testing methods.
					CO3	Apply the interface design standards/guidelines for cross cultural and disabled users.
					CO4	Categorize, Design and Develop Human Computer Interaction in
47	1F-00	MCA-Master of Computer Application	4010193121	Big Data Analytics Lab	CO1	To understand the basic principles, concepts of Big Data Analyze and interpret data using an ethically responsible approach.
					CO2	Collect, manage, store, query, and analyze various form of big data
					CO3	Gain hands-on experience on large-scale analytics tools to solve some open big data problems
					CO4	Understand the impact of big data for business decisions and strategy.
48	1F-00	MCA-Master of Computer Application	4010193122	IOT Lab	CO1	and which different methods may be suited to solving a given
					CO2	Formalize a given problem in the language/framework of different methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
					CO3	Implement basic algorithms (e.g., standard search algorithms or dynamic programming).
					CO4	Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.
49	1F-00	MCA-Master of Computer Application	4010193123	Network Security & Cryptography Lab	CO1	Develop solutions for encryption and decryption algorithms
					CO2	Develop solutions for public key encryption techniques
					CO3	Develop solutions for private key encryption techniques
					CO4	Develop a solutions for real time cryptographic problems.
50	1F-00	MCA-Master of Computer Application	4010193232	Technical Seminar on Latest Technologies/ Certification Course	CO1	Identify and understand assumptions, theses, and arguments that exist in the work of authors.
					CO2	Extend intellectual discovery and unravel complexities of thought.
					CO3	Evaluate initial hypotheses in light of evidence and collaborative discussion with the goal of making considered judgments.
					CO4	Improve reflective listening and inclusive, respectful conversation
					CO1	Apply domain knowledge during the course of internship
					CO2	Develop/implement the solutions with appropriate techniques, resources and contemporary tools.

51	1F-00	MCA-Master of Computer Application	4010193237	Internship	CO3	Work independently and in a collaboration in multidisciplinary environment and to allocate time effectively and manage to complete the work allotted within stipulated time.
					CO4	Exhibit integrity and ethical behavior while carrying out the internship and for the preparation of internship report and to demonstrate effective oral and written communication skills
52	1F-00	MCA-Master of Computer Application	4010193238	Internship /Major Project	CO1	Analyze a complex computing problem and to apply software
					CO2	Investigate and develop computing-based solution using mordern tools that help in sustaining environment and society.
					CO3	Use formal and informal discussions with team members and guide, make presentations and prepare technical document.
					CO4	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

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

7	VR19	03	B.Tech-Mechanical Engineering	1000191101	Mathematics-II	CO2	Compute Interpolating polynomial for the given data.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Compute Numerical Solution of ODE and Numerical Integration.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Evaluate simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix.
8	VR19	03	B.Tech-Mechanical Engineering	1000191200	TRANSFORMS AND VECTOR CALCULUS	CO1	Formulate any period function in terms of sine and cosine
	VR19	03	B.Tech-Mechanical Engineering			CO2	Simplify a non periodic function as integral representation
	VR19	03	B.Tech-Mechanical Engineering			CO3	Apply multiple integration techniques in evaluating areas and volume bounded by region.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Explain Gradient, divergence and curl operations in vector and scalar fields and apply Green's, Gauss and Stokes theorem as the generalisation of fundamental theorem of integral calculus.
9	VR19	03	B.Tech-Mechanical Engineering	1000191220	ENGINEERING CHEMISTRY	CO1	Measure water quality parameters, corrosive environment and protection of pre metal
	VR19	03	B.Tech-Mechanical Engineering			CO2	Acquire the knowledge on advanced materials
	VR19	03	B.Tech-Mechanical Engineering			CO3	Inspect corrosive environments and protection of precious metal.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Identify different polymers and their functionalities, acquire knowledge on vari Engineering materials
10	VR19	03	B.Tech-Mechanical Engineering	1000191220	ENGINEERING CHEMISTRY LAB	CO1	Analyze& generate experimental skills.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Enhance the thinking capabilities in the modern trends of engineering & technology.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Learn and apply basic techniques used in chemistry laboratory for preparation of Organic compounds.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Learn safety rules in the practice of laboratory investigation.
11	VR19	03	B.Tech-Mechanical Engineering	1002191220	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	CO1	Apply Ohms Law and Kirchhoff's Laws and solve electrical circuits
	VR19	03	B.Tech-Mechanical Engineering			CO2	Describe the constructional features of DC machines, select suitable starters for DC motors estimate losses and efficiency of DC motor.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Outline the constructional details and operating principles of AC machines and calculate the efficiency identify the characteristics, losses and efficiency of a three phase induction motor.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Identify the structure, operation and characteristics and applications of measuring instruments and semiconductor devices.
12	VR19	03	B.Tech-Mechanical Engineering	1003191101	ENGINEERING DRAWING	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR19	03	B.Tech-Mechanical Engineering			CO2	Develop the orthographic projections of points and lines.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Apply the knowledge of orthographic projection to draw the views of both planes and solids.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Analyse orthographic projections to develop isometric views and vice-versa
13	VR19	03	B.Tech-Mechanical Engineering	1003191210	ENGINEERING WORKSHOP	CO1	Understand different operations: Fitting, smithy, carpentry and Electrical wiring.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Perform the fitting and carpentry operations.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Develop simple objects like funnel, elbow etc. using sheet metal.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Apply basic electrical engineering knowledge for house wiring practice like stair case wiring, series and parallel connections

15	VR19	03	B.Tech-Mechanical Engineering	1000191130	CONSTITUTION OF INDIA	CO1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Distinguish the power of state and central centralgovernment.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Summarize theelection procedure in India before and after independence
	VR19	03	B.Tech-Mechanical Engineering			CO4	Association with the powers and functions of Municipalities, Panchayats and Cooperative Societies.
16	VR19	03	B.Tech-Mechanical Engineering	1000192100	Complex Variables &Statistical Methods	CO1	Analyse the complex functions with reference to their analyticity.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Analyse the complex integration by using Cauchy's integral formula and find Taylor's, Maclaurin's series and Laurent series expansion of complex function.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Evaluate contour integrals by using Residue theorem andExplain the notation of random variables and Evaluate theexpected value and probability of random variables
	VR19	03	B.Tech-Mechanical Engineering			CO4	Evaluate the confidence levels and maximum errors forlarge and small samplings and Apply the concept of hypothesis testing for large and small samples in real. Lifesituations
17	VR19	03	B.Tech-Mechanical Engineering	1003192120	MATERIALS ENGINEERING	CO1	Categorize the properties of metals/alloys with respect to crystal structure, grain size andunderstandthe necessity of alloying
	VR19	03	B.Tech-Mechanical Engineering			CO2	Explainthe concept of phase & phase diagram &understand the basic terminologies associated with metallurgy.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Understand and suggest the heattreatmentprocess&strengthening mechanisms. Significance of properties Vs microstructure.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Identify the features and recommend appropriate materials viz. Ferrous alloys, non- ferrous alloys and composite materials for suitable application.
18	VR19	03	B.Tech-Mechanical Engineering	1003192121	MECHANICS OF SOLIDS	CO1	Identify the various stresses and strains that structural members experience under varied loading circumstances.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Evaluate the shear force, bending moment, deflection of beams, and torsional stresses for different loading and support conditions.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Assess societal issues by analysing the behaviour of various beams and columns under various loads and support conditions
	VR19	03	B.Tech-Mechanical Engineering			CO4	Analyze the stresses in thin and thick pressure vessels to arrive an optimum section to withstand the internal pressure.
19	VR19	03	B.Tech-Mechanical Engineering	1003192100	THERMODYNAMICS	CO1	Acquire knowledge related to energy interactions in various fields of thermal engineering
	VR19	03	B.Tech-Mechanical Engineering			CO2	Importance of hidden governing laws behind various engineering systems specially used in power generation
	VR19	03	B.Tech-Mechanical Engineering			CO3	Outline the degree of disorder and its associated changes in the system as well as surroundings
	VR19	03	B.Tech-Mechanical Engineering			CO4	Evaluate the properties of air, pure substances and perfect gases with respect to temperature change.
	VR19	03	B.Tech-Mechanical Engineering		FLUID MECHANICS &	CO1	Understand the properties of fluids and the applications of fluid mechanics
	VR19	03	B.Tech-Mechanical Engineering			CO2	Analyse property measuring devices

20	VR19	03	B.Tech-Mechanical Engineering	1003192122	FLUID MACHINES	CO3	Relate the concept of the boundary layer in resolving continuity, momentum, and energy equations on an activity basis
	VR19	03	B.Tech-Mechanical Engineering			CO4	Apply the principles of hydraulic pumpsfor domestic, agricultural and industrial applications
21	VR19	03	B.Tech-Mechanical Engineering	1000192110	COMMUNICATION SKILLS LABORATORY	CO1	Examine introspect on individual strengths and weaknesses, and emerge as a balanced personality with improved self-awareness and self-worth
	VR19	03	B.Tech-Mechanical Engineering			CO2	Write a resume and gain the confidence to face an interview
	VR19	03	B.Tech-Mechanical Engineering			CO3	Develop the interpersonal skills to conduct himself/herself effectively in everyday professional and social contexts.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Communicate in a group with confidence.
22	VR19	03	B.Tech-Mechanical Engineering	1005192170	Mini Project – I EPICS/Societal relevant project	CO1	Understand the need of optimum design of a mechanical component or an assembly and Study the procedure to bring cost effective manufacturing process with proper material selection and technical procedure of planning the work.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Apply the engineering knowledge, mathematics, design thinking and project management to develop a community project.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Realize the significance of real time applications, energy management and environmental affects.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Obtain the skill of data collection and technical report writing.
23	VR19	03	B.Tech-Mechanical Engineering	1003192200	Kinematics of Machinery	CO1	Describe different kinematic inversions of four bar mechanisms and process of finding and applying velocity and accelerations to Agriculture and mechanical machine components.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Produce different straight-line mechanisms and their applications in Automobile Engines and steering mechanism.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Examine different cam and follower motions and their applications in IC engines.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Solve different operating problems in transmission of power by belt, gear and gear trains.
24	VR19	03	B.Tech-Mechanical Engineering	1003192220	APPLIED THERMODYNAMICS-I	CO1	Differentiate the basic combustion cycles and working of various IC engines along with engine systems and losses associated with engines.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Learn the combustion physics involved in spark ignition and compression ignition engines and discuss the affects on environment
	VR19	03	B.Tech-Mechanical Engineering			CO3	Familiarize with the testing methods involved in determining and measurement of various performance parameters in SI and CI engines.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Discuss the working principles of reciprocating air compressors and apply the principles in carrying out performance analysis.
25	VR19	03	B.Tech-Mechanical Engineering	1003192221	MANUFACTURING PROCESSES	CO1	Understand the casting, welding, sheet metal and powder metallurgy processess.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Analyze the force requirements for various bulk and sheet metal forming
	VR19	03	B.Tech-Mechanical Engineering			CO3	operations.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Importance of powder metallurgy process and processing of plastics

26	VR19	03	B.Tech-Mechanical Engineering	1003192222	MACHINE DRAWING	CO1	Understand and apply the knowledge of machine drawing as a system of communication in which ideas are expressed clearly and all information fully conveyed
	VR19	03	B.Tech-Mechanical Engineering			CO2	Identify and classify the functionalities of various machine elements such as vices, bearings, screw jacks, shafts, fasteners, keys, cotters, pins and their assembly with respect to design Standardization.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Construct an assembly drawing from the given part drawings of machine components.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Improve the 2D model components of various machine components using AUTOCAD software
27	VR19	03	B.Tech-Mechanical Engineering	1000192230	ENVIRONMENTAL SCIENCE	CO1	Elucidate the natural resource & their importance for the sustenance of life and recognises the need to conserve natural resource
	VR19	03	B.Tech-Mechanical Engineering			CO2	Gives the broad view on the various attributes of pollution & and their impact & measure to reduce he pollution along with waste management
	VR19	03	B.Tech-Mechanical Engineering			CO3	Debates on social issues both rural and urban environment possible means to combat the challenges and trace the legislation of India towards sustainability
	VR19	03	B.Tech-Mechanical Engineering			CO4	Educates about Environmental Impact Assessment, Environmental Impact Statement & Environmental Audit
28	VR19	03	B.Tech-Mechanical Engineering	1020192100	EMPLOYABILITY READINESS PROGRAM 1	CO1	Students have the adequate writing skills that are needed in an organization
	VR19	03	B.Tech-Mechanical Engineering			CO2	Understand the core competencies to succeed in professional and personal life
	VR19	03	B.Tech-Mechanical Engineering			CO3	Solve various Basic Mathematics problems by following different methods and to perform well in various competitive exams and placementdrives.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
29	VR19	03	B.Tech-Mechanical Engineering	1003193100	Design of Machine Elements -I	CO1	Apply the design procedure to engineering problems, including the consideration of technical and manufacturing constraints.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Select suitable materials and significance of tolerances and fits in critical design applications.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Design various mechanical elements as per design procedure for strength, stiffness and fatigue
	VR19	03	B.Tech-Mechanical Engineering			CO4	Identify the loads, the machine members subjected and calculate static and dynamic stresses to ensure safe design
30	VR19	03	B.Tech-Mechanical Engineering	1003193120	DYNAMICS OF MACHINERY	CO1	Understand the Gyroscopic effect on sea , air and surface transport vehicles to establish safety.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Analyze the torque and effect of friction in mechanical systems
	VR19	03	B.Tech-Mechanical Engineering			CO3	Examine the energy fluctuation in the flywheels and governors.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Evaluate balancing of rotary and reciprocating masses to curb the failure
	VR19	03	B.Tech-Mechanical Engineering			CO1	Understand the working principle of all components and their types in a steam power plant such as boilers, nozzles, turbines and condensers.

31	VR19	03	B.Tech-Mechanical Engineering	1003193101	APPLIED THERMODYNAMICS-II	CO2	Apply the conceptual theories in solving problems on all components employed in the steam power plant.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Evaluate the performance of impulse and reaction turbines by applying the theory of compounding.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Apply the principle of Newton's laws to Jet Propulsion systems such as gas turbines and rockets.
32	VR19	03	B.Tech-Mechanical Engineering	1003193121	MANUFACTURING TECHNOLOGY	CO1	Understand the metal cutting mechanisms and different machining processes.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Select the suitable cutting tool material for various machining operations.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Choose the type of machine based on the geometry of the final component.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Importance of CNC machininigprocessesforinductrial needs.
33	VR19	03	B.Tech-Mechanical Engineering	1005193161	DATA STRUCTURES	CO1	Relate data structure concepts with real time applications.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Apply linear and non-linear data structures by identifying the appropriate need.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Analyze searching and sorting techniques for effective management of data
	VR19	03	B.Tech-Mechanical Engineering			CO4	Design and implement operations of linear and nonlinear data structures
34	VR19	03	B.Tech-Mechanical Engineering	1020193160	EMPLOYABILITY READINESS PROGRAM II	CO1	Write the professional documents that are needed in an organization and To perform well during Campus Drives and different Interviews
	VR19	03	B.Tech-Mechanical Engineering			CO2	Understand the core competencies to succeed in professional and personal life and Students will develop knowledge and experience with the use of the standard C programming language.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Solve various Basic Mathematics problems by following different methods and analyses, summarize and present information in quantitative forms including table, graphs and formulas
	VR19	03	B.Tech-Mechanical Engineering			CO4	Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
35	VR19	03	B.Tech-Mechanical Engineering	1001193161	INDUSTRIAL WASTE AND WASTE WATER ENGINEERING	CO1	Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation
	VR19	03	B.Tech-Mechanical Engineering			CO2	Impart knowledge on selection of treatment methods for industrial wastewater.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Describe the common methods of treatment in different industries
	VR19	03	B.Tech-Mechanical Engineering			CO4	Explain operational problems of common effluent treatment plant
36	VR19	03	B.Tech-Mechanical Engineering	1002193160	SOLAR PHOTOVOLTAIC ENERGY SYSTEMS	CO1	Explain the fundamentals of solar photovoltaic (PV) energy systems
	VR19	03	B.Tech-Mechanical Engineering			CO2	Analyze the characteristics of solar radiation, PV cells, modules and arrays
	VR19	03	B.Tech-Mechanical Engineering			CO3	Analyze the characteristics of solar radiation, PV cells, modules and arrays
	VR19	03	B.Tech-Mechanical Engineering			CO4	Analyze the system level issues related to PV energy systems
37	VR19	03	B.Tech-Mechanical Engineering	1099193130	PROFESSIONAL ETHICS AND HUMAN VALUES	CO1	Understood the core values that shape the ethical behavior of an engineer
	VR19	03	B.Tech-Mechanical Engineering			CO2	Define importance of human values, harmony and ethical behavior in real life situations
	VR19	03	B.Tech-Mechanical Engineering			CO3	Apply the professional ethics and human values in real life situations.

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

42	VR19	03	B.Tech-Mechanical Engineering	1003193221	INSTRUMENTATION & METROLOGY	CO3	Develop the measuring instruments for measurement of displacement,speed,temparature,pressure ,strain,linear and angular measurements
	VR19	03	B.Tech-Mechanical Engineering			CO4	Categorize the instruments for checking various elements of fits,surface roughness,screw thread and gear tooth parameters
43	VR19	03	B.Tech-Mechanical Engineering	1012193161	FUNDAMENTALS OF PYTHON PROGRAMMING	CO1	Create the environment and run basic programs by make use of fundamental concepts
	VR19	03	B.Tech-Mechanical Engineering			CO2	Define and demonstrate the use of built-in data structures.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Import packages to the current working environment and create user defined modules.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Implement object-oriented concepts and handle exceptions and files
44	VR19	03	B.Tech-Mechanical Engineering	1005193160	PROGRAMMING IN C++	CO1	Understand the basic terminology used in object-oriented programming
	VR19	03	B.Tech-Mechanical Engineering			CO2	Describe the object-oriented programming approach in connection with C++
	VR19	03	B.Tech-Mechanical Engineering			CO3	Apply the concepts of object- oriented programming
	VR19	03	B.Tech-Mechanical Engineering			CO4	Apply virtual and pure virtual function & complex programming situations
45	VR19	03	B.Tech-Mechanical Engineering	1001193260	ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT	CO1	Understand evaluate and create the basic concept of environmental impact assessment, environmental Impacts.Flow of EIA, types of
	VR19	03	B.Tech-Mechanical Engineering			CO2	Implement different methods in preparing an Environmental Impact Statement.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Identify various mitigation measures that can be used.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Choose methodology for identification of environmental impacts, environmental indices and indicator.
46	VR19	03	B.Tech-Mechanical Engineering	1002193260	ELECTRIC VEHICLES	CO1	Understand the concepts and drive train configurations of electric drive vehicles.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Describe different electric propulsion systems and energy storage devices
	VR19	03	B.Tech-Mechanical Engineering			CO3	Discuss the technology, design methodologies and control strategy of electric vehicles.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Explain battery charger topologies for electric vehicles and discuss how the sizing of the drive system is done and energy management strategies used in electric.
47	VR19	03	B.Tech-Mechanical Engineering	1003193250	CONDITION MONITORING	CO1	Understand the basic vibration problems and develop mathematical models using Mass, spring and damper concepts
	VR19	03	B.Tech-Mechanical Engineering			CO2	Evaluate the vibrating system response and analyse the behavior of vibrating systems
	VR19	03	B.Tech-Mechanical Engineering			CO3	Apply the knowledge of vibration analysis, thermography techniques, oil and wear debris analysis for identifying faults in machine components
	VR19	03	B.Tech-Mechanical Engineering			CO4	Analyse the defects in components using the knowledge of ultrasonic monitoring methods
48	VR19	03	B.Tech-Mechanical Engineering	1003193251	GAS DYNAMICS AND JET	CO1	Illustrate fluid flow systems.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Analyze the isotropic flow of an ideal gas and its parameter.

	VR19	03	B.Tech-Mechanical Engineering	[illegible]	[illegible] PROPULSION	CO3	Explain frictional flow with heat transfer problems.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Analyze the impact of heat transfer on flow parameters.
49	VR19	03	B.Tech-Mechanical Engineering	1003193160	INDUSTRIAL ROBOTICS	CO1	Understand the various robot configuration and components
	VR19	03	B.Tech-Mechanical Engineering			CO2	Choose appropriate actuators and sensors for a robot based on specific application
	VR19	03	B.Tech-Mechanical Engineering			CO3	Analyze the kinematic and dynamic analysis for simple serial kinematic chains
	VR19	03	B.Tech-Mechanical Engineering			CO4	Explain trajectory planning for a manipulator by avoiding obstacles.
50	VR19	03	B.Tech-Mechanical Engineering	1003193252	OPERATIONS RESEARCH	CO1	Develop the different linear programming and assignment models for domain specific situations.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Analyze the different transportation models.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Design inventory and queueing theory models for optimal decisions.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Apply optimal strategy to real time applications using dynamic programming and game theory.
52	VR19	03	B.Tech-Mechanical Engineering	1003194100	FINITE ELEMENT METHODS	CO1	Understand the concepts of potential energy, variational methods and weighted residual methods.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Identify the suitable FEA elements such as bars, truss, beams, constant strain triangle and isoparametric elements to create Finite Element Model with respect to the application
	VR19	03	B.Tech-Mechanical Engineering			CO3	Apply the suitable boundary conditions to the finite element model and solve the engineering problems
	VR19	03	B.Tech-Mechanical Engineering			CO4	Identify the finite element concept expands beyond the structural domain, for problems involving dynamics and heat transfer.
53	VR19	03	B.Tech-Mechanical Engineering	1003194101	CAD/CAM	CO1	Describe basic structure of CAD workstation, Memory types, input/output devices and display devices and computer graphics
	VR19	03	B.Tech-Mechanical Engineering			CO2	Apply knowledge of mathematical concept for geometry manipulation and modelling of curves, surfaces and solids
	VR19	03	B.Tech-Mechanical Engineering			CO3	Develop a programming for NC operations using various methods available
	VR19	03	B.Tech-Mechanical Engineering			CO4	Define the use of GT and CAPP for the product development.
54	VR19	03	B.Tech-Mechanical Engineering	1099192200	MANAGEMENT SCIENCE	CO1	Illustrate the insights of management principles.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Summerize production process, quality control and inventory techniques.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Identify strategies and policies to functional areas.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Apply contemporary management polocies.
	VR19	03	B.Tech-Mechanical Engineering			CO1	Identify Methods in AI that may be suited to solve a given problem and Game Playing

55	VR19	03	B.Tech-Mechanical Engineering	1005193261	ARTIFICIAL INTELLIGENCE	CO2	Make use of AI search algorithms and formalizations on real world problems
	VR19	03	B.Tech-Mechanical Engineering			CO3	Analyze the basic issues of different types of knowledge representation techniques to build intelligent system
	VR19	03	B.Tech-Mechanical Engineering			CO4	Apply probabilistic and fuzzy models to solve problems with uncertainty
56	VR19	03	B.Tech-Mechanical Engineering	1005194160	INTRODUCTION TO MACHINE LEARNING	CO1	Appraise the importance of data and choose an appropriate algorithm to create a models
	VR19	03	B.Tech-Mechanical Engineering			CO2	Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervised
	VR19	03	B.Tech-Mechanical Engineering			CO3	Relate various machine learning and deep learning algorithms with real world applications
	VR19	03	B.Tech-Mechanical Engineering			CO4	Analyze how to evaluate models build from the sample datasets on web
57	VR19	03	B.Tech-Mechanical Engineering	1001194160	DISASTER MANAGEMENT	CO1	To know the basic concepts in Disasters and its triggering factures
	VR19	03	B.Tech-Mechanical Engineering			CO2	To understand stages of hydrological disaster
	VR19	03	B.Tech-Mechanical Engineering			CO3	To analysis the causes, effects, impacts and of hydrological, geological and coastal hazards.
	VR19	03	B.Tech-Mechanical Engineering			CO4	To understand the mitigation procedure of uncertain events
58	VR19	03	B.Tech-Mechanical Engineering	1003194150	UNCONVENTIONAL MACHINING PROCESSES	CO1	Describe the need and importance of non-traditional machining methods and Apply the basic principle, equipment, process variables and mechanics of metal removal rate
	VR19	03	B.Tech-Mechanical Engineering			CO2	Design and analyze the surface finish and material removal in Chemical machining, electro chemical machining, electro chemical grinding,
						CO3	Estimate the material removal rate and effect of process parameters in EDM, Electric discharge grinding and wire cut EDM process.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Analyze the material removal rate in Electron Beam Machining and Laser Beam Machining processes and identify the effect of process parameters.
59	VR19	03	B.Tech-Mechanical Engineering	1003194151	MECHATRONICS	CO1	Understand the various mechatronics systems and their levels including the fundamental principles of different sensors and transducers
	VR19	03	B.Tech-Mechanical Engineering			CO2	Develop the model containing solid state electronic devices and make use of signal processing and conditioning theories
	VR19	03	B.Tech-Mechanical Engineering			CO3	Analyze various actuating systems to design mechatronic motion logic control system
	VR19	03	B.Tech-Mechanical Engineering			CO4	Assess PLC programming techniques and data acquisition systems for implementation of micro mechatronics systems

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

66	VR19	03	B.Tech-Mechanical Engineering	100319418	NON-DESTRUCTIVE EVALUATION	CO1	Understand the basic knowledge of different NDE techniques which enables to carry out the various inspection.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Relate the ultrasonic testing method in various applications with other methods.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Aquire the knowledge of liquid penetrant, eddy current, magnetic particle testing methods and discuss the advantages and shortcomings
	VR19	03	B.Tech-Mechanical Engineering			CO4	differentiate various defect types and select appropriate testing method for better evaluation
67	VR19	03	B.Tech-Mechanical Engineering	1003194159	ADVANCED MATERIALS	CO1	Understand the properties of constituents, classification of composites and their suitability for the structural applications.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Categorize and process of different PMC, MMC & CCC with their applications
	VR19	03	B.Tech-Mechanical Engineering			CO3	Compute micromechanical analysis of Lamina.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Compare Nano materials with bulk materials.
68	VR19	03	B.Tech-Mechanical Engineering	1003194101	CAD/CAM LAB	CO1	Apply of CAD computational analysisi tools to engineering desing and create a compute CAD documenttation for an engineering design
	VR19	03	B.Tech-Mechanical Engineering			CO2	Model complex shapes including freeform curves and surfaces
	VR19	03	B.Tech-Mechanical Engineering			CO3	Explain basic concepts of NCN programming machining
69	VR19	03	B.Tech-Mechanical Engineering	1005193260	Introduction to Database Management Systems	CO1	Identify the basic concepts and various data model used in database design, design ER model for a given problem and formulate SQL queries.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression from queries.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Intrepret the use of normalization and functional dependency, indexing and hashing technique used in database design.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Apply and relate the concept of transaction, concurrency control and recovery in database.
70	VR19	03	B.Tech-Mechanical Engineering	1005193102	OPERATING SYSTEMS	CO1	Categorize and assess various types of operating systems and execution of system calls at each phase.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Analyze various process scheduling and memory management techniques to develop better solutions.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Formulation of dead lock management, resource management techniques and IPC abstraction.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Ability to perform tasks in Windows/ UNIX / Linux /Android and other environments.
71	VR19	03	B.Tech-Mechanical Engineering	1005193161	FUNDAMENTALS OF WEB TECHNOLOGY	CO1	Create visualizations in accordance with static UI using HTML tags
	VR19	03	B.Tech-Mechanical Engineering			CO2	Apply intermediate and advanced web development practices
	VR19	03	B.Tech-Mechanical Engineering			CO3	Develop a fully functioning website using PHP and AJAX
	VR19	03	B.Tech-Mechanical Engineering			CO4	Analyze information from data and implement the same into web applications

72	VR19	03	B.Tech-Mechanical Engineering	1003194250	ALTERNATIVE FUELS	CO1	CO1 Understand the current scenario of alternative fuels and reserve status of fossil fuels.
	VR19	03	B.Tech-Mechanical Engineering			CO2	CO2 Elucidate the important properties, production and storage of hydrogen and other gaseous fuels and address the implications during their use in IC engines.
	VR19	03	B.Tech-Mechanical Engineering			CO3	CO3 Evaluate the performance of clean propulsion technologies.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Analyse the behavior of engines during the usage of alternative fuels
73	VR19	03	B.Tech-Mechanical Engineering	1003194251	GREEN ENGINEERING SYSTEMS	CO1	Distinguish various types of solar thermal collectors
	VR19	03	B.Tech-Mechanical Engineering			CO2	Describe the working of a photovoltaic system and wind energy conversion system
	VR19	03	B.Tech-Mechanical Engineering			CO3	Analyze the operation of fuel cells and biomass conversion technologies
	VR19	03	B.Tech-Mechanical Engineering			CO4	Elaborate on ocean, geothermal, electrical and Mechanical systems
74	VR19	03	B.Tech-Mechanical Engineering	1003194252	DESIGN FOR MANUFACTURE	CO1	Understanding basic design rules for manufacturing and material selection
	VR19	03	B.Tech-Mechanical Engineering			CO2	Applying the production process for ease of manufacturing
	VR19	03	B.Tech-Mechanical Engineering			CO3	Analyze factors for selection of metals and alloys and relationship to manufacturing processes
	VR19	03	B.Tech-Mechanical Engineering			CO4	Apply the concepts of design for manufacturing for product development
75	VR19	03	B.Tech-Mechanical Engineering	1003194253	PRODUCTION PLANNING AND CONTROL	CO1	Understand the basics of workflow and becomes well acquainted with line balancing and mixed model production theories.
	VR19	03	B.Tech-Mechanical Engineering			CO2	Comprehend the concepts of demand forecasting and the quantitative methods to meet the market demand.
	VR19	03	B.Tech-Mechanical Engineering			CO3	Differentiate EOQ, ABC and VED models.
	VR19	03	B.Tech-Mechanical Engineering			CO4	Apply the concepts of demand, supply to the production planning across all industries.
76	VR19	03	B.Tech-Mechanical Engineering	1003194270	MAIN PROJECT /INTERNSHIP	CO1	Analyze the entrepreneurship design and the business environment
	VR19	03	B.Tech-Mechanical Engineering			CO2	Difine industrial policies
	VR19	03	B.Tech-Mechanical Engineering			CO3	Explain the business preparation
	VR19	03	B.Tech-Mechanical Engineering			CO4	Integrate the knowledge of various courses and their applications in industry

PRINCIPAL
VIGNAN'S INSTITUTE OF
Information Technology (A)
Beside: VSEZ, Duvvada, Visakhapatnam-40

VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY (A)							
DEPARTMENT OF ELECTRONICS AND COMPUTER ENGINEERING							
	COURSE OUTCOMES						
S.No	Regulation	Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
1	VR19	19	B.Tech-Electronics and Computer Engineering	1000191100	Mathematics-I	CO1	Executing mean value theorems and evaluate maxima and minima of functions of two variables without constraints
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Apply the analytical methods to solve higher order linear differential equations.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Evaluate of solution of Ordinary differential equations by using Laplace Transform technique.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Identify and solve partial differential equations
2	VR19	19	B.Tech-Electronics and Computer Engineering	1000191123	APPLIED CHEMISTRY	CO1	Identification of different polymers and their functionalities
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Determination of structure to many compounds and apply the basic knowledge in construction of cell and its applications
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Analysis of corrosive environments and protection of precious metal
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Adoption of different green methodologies and acquire knowledge on different advanced materials
3	VR19	19	B.Tech-Electronics and Computer Engineering	1000191101	MATHEMATICS – II	CO1	Solve approximate roots of an equation by using different numerical methods.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Compute Interpolating polynomial for the given data
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Compute Numerical Solution of ODE and Numerical Integration.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Evaluate simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix.
4	VR19	19	B.Tech-Electronics and Computer Engineering	1003191101	ENGINEERING DRAWING	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Learn the principle of orthographic projections. Draw Orthographic projections of points, lines.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Draw the various types of planes and solids its views in different Positions
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Draw isometric views of simple objects
5	VR19	19	B.Tech-Electronics and Computer Engineering	1005191120	PROBLEM SOLVING AND PROGRAMMING USING C	CO1	Write compile and debug Programs in C language
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Use operators, data types and write programs
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Select the best loop construct for a given problem
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Design and implement C programs
	VR19	19	B.Tech-Electronics and Computer Engineering			CO1	Realize the purpose/Role of Engineer for solving social problems

6	VR19	19	B.Tech-Electronics and Computer Engineering	1000191110	ENGINEERING EXPLORATION	CO2	Learn to Design a component/system in an engineering way
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Learn to use mechanisms, Arduino, sensors, motors.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Integrating different systems (mechanical/Electrical/computer) to work as a unit
7	VR19	19	B.Tech-Electronics and Computer Engineering	1000191200	Transforms and Vector Calculus	CO1	Formulate any period function in terms of sine and cosine
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Simplify a non periodic function as integral representation
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Apply multiple integration techniques in evaluating areas and volume bounded by region.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Explain Gradient, divergence and curl operations in vector and scalar fields and apply Green's, Gauss and Stokes theorem as the generalisation of fundamental theorem of integral calculus.
8	VR19	19	B.Tech-Electronics and Computer Engineering	1000191222	WAVE OPTICS AND SEMICONDUCTOR PHYSICS	CO1	Discuss the wave phenomena of light and apply these principles to describe electromagnetic wave propagation.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Apply the knowledge of basic quantum mechanics, to set up one-dimensional Schrodinger's wave equation
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Identify the importance of classical and quantum mechanical treatment of materials.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Make use of the basic concepts of energy bands in crystalline solids to understand semiconductor physics.
9	VR19	19	B.Tech-Electronics and Computer Engineering	1005191221	DATA STRUCTURES	CO1	Outline the need for data structure techniques
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Implement standard data
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	structures like stack, queue, list, tree and graph
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	structures like stack, queue, list, tree and graph
10	VR19	19	B.Tech-Electronics and Computer Engineering	1002191201	NETWORK ANALYSIS	CO1	Apply the basic circuit analysis techniques, in DC circuits and To know the performance of the circuits
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze steady state analysis of AC circuits
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze steady state analysis of electrical circuits using theorems
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Gain the knowledge in characteristics of two port networks using parameters (Z, Y, ABCD, h) and Analyze Transient state analysis of Accircuits
11	VR19	19	B.Tech-Electronics and Computer Engineering	1000191121	TECHNICAL ENGLISH COMMUNIC	CO1	Read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources, Social Awareness
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze the functions of language and grammar in spoken and written forms.

11	VR19	19	B.Tech-Electronics and Computer Engineering	1000191121	COMMUNICATION	CO3	Write effectively on various domains.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Prepare and exhibit oral presentation skills by using ICT(Individual/Team)
12	VR19	19	B.Tech-Electronics and Computer Engineering	1005191210	IT Workshop	CO1	Understand the basic components and peripherals of a computer.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	To become familiar in configuring a system.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Learn the usage of productivity tools.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Acquire knowledge about the netiquette and cyber hygiene.
13	VR19	19	B.Tech-Electronics and Computer Engineering	1000191130	CONSTITUTION OF INDIA (Audit Course)	CO1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Distinguish the power of state and central central government
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Summarize the election procedure in India before and after independence
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Association with the powers and functions of Municipalities, Panchayats and Cooperative Societies.
15	VR19	19	B.Tech-Electronics and Computer Engineering	1099192100	Managerial Economics and Financial Analysis	CO1	Analyze the Demand, Price and Cost.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Identify the Nature of different markets to determine Price Output for different Business Units
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Interpret various forms of businesses
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Evaluate and Prepare investment project proposals and Financial Statements
16	VR19	19	B.Tech-Electronics and Computer Engineering	1000191202	PROBABILITY AND STATISTICS	CO1	Explain the notion of random variable and evaluate the expected value and probability of random variables.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Apply Binomial, Poisson, Normal, gamma and weibull distributions for real data to compute probabilities, theoretical frequencies.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Evaluate the confidence levels and maximum error for large and small samples
						CO4	Apply the concept of hypothesis testing for large and small samples in real life situations to draw the inferences and estimate the goodness of fit.
	VR19	19	B.Tech-Electronics and Computer Engineering			C05	Examine correlation for the bi-variate data and fit the different curves using principle of least squares and to predict the regression analysis
	VR19	19	B.Tech-Electronics and Computer Engineering		ELECTRONI	CO1	Summarize the characteristics of PN junction diode in different modes of operation.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Compare the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.

17	VR19	19	B.Tech-Electronics and Computer Engineering	1004192120	ELECTRONIC DEVICES & CIRCUITS	CO3	Summarize the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations and understand the various biasing techniques for BJT and FET.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Explain the stabilization concepts with expressions and perform the analysis of small signal low frequency transistor amplifier circuits using BJT
18	VR19	19	B.Tech-Electronics and Computer Engineering	1012192120	PYTHON PROGRAMMING	CO1	Install Python IDE and run basic Python scripts.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the operators, functions, key Concepts of Object Oriented Programming in python.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Access Python from various online resources and import packages to the current working environment.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Understand file handling operations and implement ML/DS Libraries using in Python.
19	VR19	19	B.Tech-Electronics and Computer Engineering	1019192100	DIGITAL SYSTEM LOGIC DESIGN	CO1	Describe various number systems, error detecting and correcting binary codes.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Apply boolean laws, k-map & Q-M methods to minimize switching functions
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Design combinational and sequential logic circuits
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Design simple digital systems using PLDs
20	VR19	19	B.Tech-Electronics and Computer Engineering	1004192100	SIGNALS AND SYSTEMS	CO1	Characterize the signals and systems and principles of vector spaces, Concept of orthogonality
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Apply sampling theorem to convert continuous- time signals to discrete-time signal and also apply z-transform to analyze discrete-time signals and systems
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Illustrate the relationships among the various representations of LTI systems and apply the Concepts of convolution, correlation, Energy and Power density spectrums to communication problems.
21	VR19	19	B.Tech-Electronics and Computer Engineering	1019192170	Mini Project-I (EPICS/Societal Relevant Project)	CO1	Understand the various social problems present in the world & they will be able to identify and select a community problem to develop a technological project.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the various social problems present in the world & they will be able to identify and select a community problem to develop a technological project.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Learn the technologies like Internet of Things, 3D Printing, Mobile App Creation, Thinker CAD, and Web page development.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Apply the engineering knowledge, mathematics, design thinking and project management to develop a community project.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO1	Compare and contrast various software models applied to different real world applications.

22	VR19	19	B.Tech-Electronics and Computer Engineering	1005192201	Software Engineering	CO2	Evaluate the process models for the development of SDLC
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Design a prototype for a software design and user interface & apply strategies of coding & testing for the development of software
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Design a prototype for a software design and user interface & apply strategies of coding & testing for the development of software product
23	VR19	19	B.Tech-Electronics and Computer Engineering	1019192200	Electrical Technology and Instrumentation	CO1	Understand DC machines operation, testing and calculate the efficiency of DC machines.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze the performance of transformer 3-phase alternator and 3- phase induction motors.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Explain and analyze the operation of Electrical and Electronic Measuring instruments
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Describe the working principle of various sensors and actuators.
24	VR19	19	B.Tech-Electronics and Computer Engineering	1019192201	PRINCIPLES OF COMMUNICATIONS	CO1	Understand the basic principle of communication system
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Describe the principles of Analog and Digital modulation techniques and be able to analyze their performance
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Explain the various communication system parameters for different types of modulation and demodulation techniques.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Distinguish various Analog and Digital modulation techniques.
25	VR19	19	B.Tech-Electronics and Computer Engineering	1019192220	COMPUTER OPERATING SYSTEM	CO1	Apply the appropriate process models for the application development of SDLC
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the phases of SDLC from requirement gathering phase to design phase via Analysis Phase
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Analyzing the strategies for coding and testing phase in Software product development
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Apply the knowledge about estimation and maintenance of software systems and modeling the software project by using CASE tools
26	VR19	19	B.Tech-Electronics and Computer Engineering	1019192221	PULSE and DIGITAL CIRCUITS	CO1	Understand and Apply the fundamental concepts of wave shaping for various switching and signal generating circuits.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Understand and Apply the fundamental concepts of wave shaping for various switching and signal generating circuits.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze the different multivibrators and time base generators
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Analyze the different multivibrators and time base generators
	VR19	19	B.Tech-Electronics and Computer Engineering			CO1	Gain a higher level of personal involvement and interest in understanding and solving environmental resource problems and its conservation practices.

27	VR19	19	B.Tech-Electronics and Computer Engineering	1000192130	ENVIRONMENTAL SCIENCE (Audit Course)	CO2	Overall understanding of different types of natural resources and its conservation
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Recognize the interconnectedness of human dependence on the earth's ecosystems and Influence their society in proper utilization of goods and services. Learn the management of environmental hazards and to mitigate disasters and have a clear understanding of environmental concerns and follow sustainable development practices.
28	VR19	19	B.Tech-Electronics and Computer Engineering	1000192110	COMMUNICATION SKILLS LAB	CO1	Analyze the functions of language and grammar in spoken and written forms with an emphasis on LSRW Skills
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Disseminate the relevant skills while performing GDs, interviews, oral presentations with a focus on Non verbal communication
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Prepare and exhibit oral presentation skills by using ICT.(Individual/Team)
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Organize proper life skills for their employability.
29	VR19	19	B.Tech-Electronics and Computer Engineering	1019193120	Linear & Digital IC Applications	CO1	Understand basic operation and characteristics of op-amp.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Understand basic operation and characteristics of op-amp.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Explain the basic operation and characteristics of different Logic Families
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Design of digital logic Circuits using IC's
30	VR19	19	B.Tech-Electronics and Computer Engineering	1005192200	COMPUTER ORGANIZATION & ARCHITECTURE	CO1	Conceptualize the basics of organizational and architectural issues of a digital computer and to perform computer arithmetic
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze performance issues in processor and can calculate the effective address of an operand by addressing modes.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Ability to design memory organization that uses banks for different word size operations to understand the concept of cache memory techniques
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Describe the concept of Input / Output organization.
31	VR19	19	B.Tech-Electronics and Computer Engineering	1005192221	DATABASE MANAGEM	CO1	Identify the basic concepts and various data model used in database design and formulate SQL queries.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Intrepret use of normalization in designing the database.

31	VR19	19	B.Tech-Electronics and Computer Engineering	1003192221	ENT SYSTEMS	CO3	Evaluate indexing and hashing technique used in database design.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Apply and relate the concept of transaction, concurrency control and recovery in database.
32	VR19	19	B.Tech-Electronics and Computer Engineering	1019193100	FUNDAMENTALS OF ALGORITHM DESIGN AND ANALYSIS	CO1	Able to analyze the performance of an algorithm in terms of time and space.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Give an intuition on how to find a solution to large problems by dividing them into smaller sub problems.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Identifying which designing technique can be used to solve a particular problem.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Knowing how to explore the solution space by using Branch and Bound technique.
33	VR19	19	B.Tech-Electronics and Computer Engineering	1019193150	WIRELESS SENSOR NETWORKS (Professional Elective-I)	CO1	Understand the basis of Sensors with its applications
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Conceptualize the networking technologies
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Explain the protocols for wireless sensor networks
						CO4	Analyze routing and congestion algorithms
	VR19	19	B.Tech-Electronics and Computer Engineering			C05	Understand the basis of Sensors with its applications
34	VR19	19	B.Tech-Electronics and Computer Engineering	1019193151	ADVANCED DATA STRUCTURES AND ALGORITHMS (Professional Elective-I)	CO1	Understand graph representations, Minimum Spanning Trees and traversals
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Understand graph representations, Minimum Spanning Trees and traversals
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Implement heaps, queues and their operations, B Trees and B+ Trees
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Illustration of tries which share some properties of table look up, various issues related to the design of file structures
35	VR19	19	B.Tech-Electronics and Computer Engineering	1019193152	DIGITAL SIGNAL PROCESSING AND ARCHITECTURE (Professional Elective-I)	CO1	Design, simulate and realize different digital filters.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Estimate the spectra of signals that are to be processed by discrete time system and to verify the performance of various spectrum estimation techniques
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Design multi rate digital signal processing system.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Understand the architecture of DSP processor
36	VR19	19	B.Tech-Electronics and Computer Engineering	1019193153	INTRODUCTION TO COMPUTER NETWORKS (Professional Elective-I)	CO1	Define Network and its components and Illustrate the functionality of OSI and TCP/IP reference models.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Compare different network layer protocols and Demonstrate various types of routing technique
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Evaluate Architecture for Application layer protocols.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Choose appropriate protocol for desired communication service.

37	VR19	19	B.Tech-Electronics and Computer Engineering	1020192100	Employability Readiness Program-I (Open Elective-I)	CO1	Students have the adequate writing skills that are needed in an organization
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the core competencies to succeed in professional and personal life
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Solve various Basic Mathematics problems by following different methods and to perform well in various competitive exams and placement drives.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
38	VR19	19	B.Tech-Electronics and Computer Engineering	1020192101	PUBLIC ADMINISTRATION	CO1	Students will be able to understand definition, scope, approach and theories of public administration.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Students will be able to identify the process and technique of decision making and also understand the concept of administrative behaviour and control.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Students will be able to understand the process and technique of personnel and financial administration.
						CO4	Students will be able to Discuss the tools that modern public administrators use to pursue public goals and public policy, along with the pros and cons of those tools.
	VR19	19	B.Tech-Electronics and Computer Engineering			C05	Students will be able to understand and explain the major administrative techniques and values that public administration has and illustrate how those affect the work of government and also understand the process of administrative improvement.
39	VR19	19	B.Tech-Electronics and Computer Engineering	1020192102	FOREIGN LINGUISTIC – FRENCH	CO1	Students have the adequate reading and speaking skills and will be able to express himself in French.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the grammar and use them in their personal and professional life.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Students will be able to write proficiently in French.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Students will be able to compare and contrast world culture and it will expand his knowledge about various culture.
40	VR19	19	B.Tech-Electronics and Computer Engineering	1099193130	PROFESSIONAL ETHICS & HUMAN VALUES	CO1	Relate ethical human values
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Apply engineering knowledge for society
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Elaborate responsibility for safety & risk
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Outline the various current global issues

41	VR19	19	B.Tech-Electronics and Computer Engineering	1019193180	TECHNICAL SEMINAR	CO1	Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of computer
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Simulate and analyze the results reported in the chosen paper for seminar topic.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Communicate effectively before the expert panel and develop technical reports.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Respond to the queries raised by the evaluation committee and audience
	VR19	19	B.Tech-Electronics and Computer Engineering			CO5	
42	VR19	19	B.Tech-Electronics and Computer Engineering	1019193220	Micro Processors and Micro Controllers	CO1	Understand the concepts of architecture, memory organization of Intel 8086 microprocessor and Intel 8051 and PIC 16C6X/7X
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Summarize the concepts of addressing modes, instruction set of Intel 8086 microprocessor and Intel 8051 and PIC microcontroller.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Develop an assembly language programs for simple problem statements of 8086, 8051 and PIC microcontroller.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Design an interface between peripheral chips & processors using assembly language programs.
43	VR19	19	B.Tech-Electronics and Computer Engineering	1019193221	WEB DESIGN	CO1	Understand the basic concepts of client server application and WWW
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Describe the basic concepts of HTML & CSS to design web pages and web site
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze a given problem and apply requisite appropriate tools for designing interactive web applications
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Develop reusable component for Graphical User Interface applications
44	VR19	19	B.Tech-Electronics and Computer Engineering	1019193250	VLSI Technology (Professional Elective-II)	CO1	Describe the fabrication process for MOS,CMOS and BICMOS technologies along with their electrical properties
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Outline the concepts of design rules during the layout design
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Model various scaling Models and factors and their effects on MOSFET parameters.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Examine various design issues of VLSI Circuits and illustrate FPGA Design
45	VR19	19	B.Tech-Electronics and Computer Engineering	1019193251	CELLULAR AND MOBILE COMMUNIC ATIONS	CO1	Understand the concepts, characteristics, principles and operation of cellular systems.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Apply Concepts, principles to Co-channel interference Reduction factor, Desired C/I, directional Antenna system and Cell splitting.

	VR19	19	B.Tech-Electronics and Computer Engineering		ATIONS (Professional Elective-II)	CO3	Analyse Point to point model, other cell coverage of signal and traffic, frequency and channel assignment strategies.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Compare concepts of handoff and architectures of GSM, Technology comparison of 3G, 4G and 5G cellular systems.
46	VR19	19	B.Tech-Electronics and Computer Engineering	1005193101	DATA WAREHOUSING AND DATA MINING (Professional Elective-II)	CO1	Identify stages in building a Data Warehouse and challenges in Data mining
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Access raw input data and apply data pre-processing techniques, generalization techniques and data characterization techniques to provide suitable input for a range of data mining algorithms
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze data mining techniques like classification and Association rules that can be applied to data objects and to find the
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Solve real world problems by using the various Clustering methods
47	VR19	19	B.Tech-Electronics and Computer Engineering	1012192200	AUTOMATA THEORY AND COMPILER DESIGN (Professional Elective-II)	CO1	Apply the basic concepts of Languages, operations of Languages, NFA, DFA and its conversions.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Identify the similarities and differences among various parsing techniques and will be able to solve problems related to Shift reduce parsing, compute FIRST and FOLLOW sets, LR(0), LR(1) and LALR sets of items and parse table for a given grammar
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Demonstrate the ability to write syntax directed translations of simple statements and understand the working of procedure calls and use various storage allocation schemes for the better utilization of run time memory.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Apply various schemes for optimized code and will be able to write 3 addresses code and identify the basic blocks, draw flow graphs and represent directed Acyclic graphs for the identified basic blocks and also be able to write the target optimized code (assembly code) for the given three address code.
48	VR19	19	B.Tech-Electronics and Computer Engineering	1020193100	Employability Readiness Program-II (Open Elective-II)	CO1	Students have the adequate writing skills that are needed in an organization and To perform well during Campus Drives and different Interviews
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the core competencies to succeed in professional and personal life and Students will develop knowledge and experience with the use of the standard C programming language,
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Solve various Basic Mathematics problems by following different methods and analyses, summarize and present information in quantitative forms including table, graphs and formulas
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.

49	VR19	19	B.Tech-Electronics and Computer Engineering	1004193250	DIGITAL DESIGN SYSTEM THROUGH VERILOG HDL (Open Elective-II)	CO1	Describe Verilog HDL and Design Digital circuits.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Write behavior model of digital circuits and Write RTL models of digital circuits. Verify behavior and RTL models
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Describe standard Cell Libraries and FPGAs Synthesize RTL models to standard cell libraries and FPGAs.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Implement RTL models on FPGAs and testing and verification
50	VR19	19	B.Tech-Electronics and Computer Engineering	1004193251	ARM PROCESSOR S (Open Elective-II)	CO1	Able to explain Implementation of RISC design and ARM design in ARM processors.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Program on LPC 2148 for the specific application.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Understand the peripherals microcontroller systems.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Compare the specifications and suitability of I2C, SPI, RTC, WATCHDOG,TIMER, PWM generation blocks.
51	VR19	19	B.Tech-Electronics and Computer Engineering	1001193260	ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT (OPEN ELECTIVE – II)	CO1	Understand evaluate and create the basic concept of environmental impact assessment, Flow of EIA, Types of environmental Impacts
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Implementdifferentmethodsinprepa ringanEnvironmentalImpactStatem ent
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Identify various mitigation measures that can be used.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Select methodology for identification of environmental impacts, environmental indices and indicators
52	VR19	19	B.Tech-Electronics and Computer Engineering	1005193261	OBJECT ORIENTED PROGRAMMING THROUGH JAVA (Open Elective-III)	CO1	Identify the principles of object oriented programming through Java features.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Designing the programs to read the input dynamically
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze the programs to implement the predefined and user defined exceptions with real world scenario.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Implement and analyze the programs to provide the same services to multiple clients at the same time using synchronization concepts.
53	VR19	19	B.Tech-Electronics and Computer Engineering	1005193262	OBJECT ORIENTED ANALYSIS AND DESIGN (Open Elective-III)	CO1	BUIld solutions to the complex problems using objecr oriented approach
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	identify classes and responsibilities of the problem domain
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	apply uml tools for various case studies
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	represent classes objects responsiblities and states using uml notations
54	VR19	19	B.Tech-Electronics and Computer Engineering	1005193263	CRYPTOGRAPHY AND NETWORK SECURITY	CO1	Understand the principles and practices involved in cryptography and network security
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Describe the various symmetric and Asymmetric encryption algorithms.

54	VR19	19	B.Tech-Electronics and Computer Engineering	1083193203	SECURITY (Open Elective-III)	CO3	Identifying cryptographic protocols, hash functions, authentication, key management, key exchange, signature schemes
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Design of network security solutions for E-mail Security like PGP, S/MIME and web security like SSL, TLS.
55	VR19	19	B.Tech-Electronics and Computer Engineering	1012193100	R PROGRAMMING (Open Elective-III)	CO1	Understand the R workspace and Programming with R
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Access online resources for R and import new function packages into the R workspace
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Apply math functions to calculate probability and statistical distributions and knowledge on Graphics in data visualization.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Understand and use linear, non-linear regression models, and classification techniques for data analysis
56	VR19	19	B.Tech-Electronics and Computer Engineering	1019193262	RADAR SYSTEMS (Open Elective –III)	CO1	Interpret the factors affecting the radar performance using Radar Range Equation.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Apply the principle of FMCW radar in the design of altimeter.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze the principle of each and every block of MTI and Tracking Radar
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Demonstrate the basic principle of Receiver and also extraction of signal in Noise
57	VR19	19	B.Tech-Electronics and Computer Engineering	1099192200	MANAGEMENT SCIENCE	CO1	Illustrate basic insights of management principles
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Summarize Production process, Quality control and Inventory techniques
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Indentify Strategies and policies to functional areas
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Apply Contemporary management Practices
59	VR19	19	B.Tech-Electronics and Computer Engineering	1019193260	Internet of Things (Open Elective)	CO1	Understand the Architectural view , protocols and applications of IoT.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Analyse the communication protocols and standards used in IoT
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Design the simple IoT applications to monitor or control IoT devices using simulation or hardware.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Implementation of the real time IoT applications.
60	VR19	19	B.Tech-Electronics and Computer Engineering	1019193261	EMBEDDED SYSTEM DESIGN (Open	CO1	Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Design the Embedded hardware by considering the hardware components required for an embedded system

	VR19	19	B.Tech-Electronics and Computer Engineering		Elective)	CO3	Analyse the various embedded firmware design approaches on embedded environment to suit for desired application
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Interprete how to integrate hardware and firmware of an embedded system and apply this knowledge to real time operating system
61	VR19	19	B.Tech-Electronics and Computer Engineering	1005194120	Machine Learning (Integrated Course)	CO1	Recognize the characteristics of machine learning that make it useful to real-world Problems
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervised
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Be able to use support vector machine, regularized regression algorithms
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Understand the concept behind neural networks for learning non-linear functions
62	VR19	19	B.Tech-Electronics and Computer Engineering		Machine Learning Lab	CO1	Understand the implementation procedures for the machine learning algorithms
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Design Java/Python programs for various Learning algorithms.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Apply appropriate data sets to the Machine Learning algorithms
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Identify and apply Machine Learning algorithms to solve real world problems
63	VR19	19	B.Tech-Electronics and Computer Engineering	1019194120	IOT AND ITS APPLICATIONS	CO1	Understand the Architectural view , protocols and applications of IoT.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Analyse the communication protocols and standards used in IoT
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Design the simple IoT applications to monitor or control IoT devices using simulation or hardware.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Implementation of the real time IoT applications.
64	VR19	19	B.Tech-Electronics and Computer Engineering	1005194100	BIG DATA ANALYTICS (Professional Elective-III)	CO1	Relate different aspects of BigData in accordance with various big data applications
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Catergorize various dimensions of BigData (5V's) and its sources in real time
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Make use of recent tools related to Hadoop, Spark and MapReduce etc
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Analyze the different aspects of cluster computing with real world applications
65	VR19	19	B.Tech-Electronics and Computer Engineering	1005193251	ARTIFICIAL INTELLIGENCE (PORFESSIONAL ELECTIVE – III)	CO1	Choose appropriate methods in AI that may be suited to solve a given problem and Game Playing
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Make use of AI search algorithms and formalizations on real world problems
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze the basic issues of different types of knowledge representation techniques to build intelligent system
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Apply probabilistic and fuzzy models to solve problems with uncertainty.

66	VR19	19	B.Tech-Electronics and Computer Engineering	1019194150	WIRELESS COMMUNICATION SYSTEMS (Professional Elective-III)	CO1	Apply communication concepts to solve wireless communications problems. Submit Review report from Research journals with professional ethics, team work and self-learning.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Identify existing model's, Apply cellular system design concepts, wireless wide area networks for their performance analysis. Submit Review report from Research journals with professional ethics, team work and self-learning.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Analyse various multiple access schemes used in wireless communications and existing and emerging wireless standards. Submit Review report from Research journals with professional ethics, team work and self-learning.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	
67	VR19	19	B.Tech-Electronics and Computer Engineering	1019193261	EMBEDDED SYSTEM DESIGN (Professional Elective-III)	CO1	Understand the basic concepts and hardware components of an embedded system and able to know the design approach to perform a specific function.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Identify hardware components required for an embedded system design.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Apply various embedded firmware design approaches on embedded environment.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Understand how to integrate hardware and firmware of an embedded system using real time operating system.
68	VR19	19	B.Tech-Electronics and Computer Engineering	1019194151	FUNDAMENTALS OF DIGITAL IMAGE PROCESSING (Professional Elective-IV)	CO1	Examine the fundamentals of gray scale and color image processing.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Apply different transforms and compression methods on image for image processing applications.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze the methods to extract information from the image in terms of spatial filtering, frequency filtering, restoration and segmentation.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Validate the different techniques of color and multi resolution processing.
69	VR19	19	B.Tech-Electronics and Computer Engineering	1004193160	DATA COMMUNICATIONS (Professional Elective-IV)	CO1	Understanding of basic digital switching techniques.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze the OSI model, TCP/IP model, MAC layer protocols and LAN technologies
	VR19	19	B.Tech-Electronics and Computer Engineering			CO3	Design of different Elementary Data Link Protocols.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO4	Minimize the error by using different control methods.
	VR19	19	B.Tech-Electronics and Computer Engineering			CO1	Apply the knowledge of cloud technology to infer the working principles of cloud computing

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

	VR19	19	B.Tech-Electronics and Computer Engineering		CO4	Estimate the effort required for a software project development and identify software risks.

PRINCIPAL
VIGNAN'S INSTITUTE Of
Information Technology (A)
Beside: VSEZ, Duvvada, Visakhapatnam-49

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

6	VR19	05	B.Tech-Computer Science and Engineering	1000191110	Engineering Exploration	CO2	Learn to Design a component/system in an engineering way
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Learn to use mechanisms, Arduino, sensors, motors.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	To develop prototype machine using Arduino Uno board.
7	VR19	05	B.Tech-Computer Science and Engineering	1000191131	Extra Curricular Activities, Sports and Games	CO1	Learn new skills and Boost academic performance
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Broader social skills with improved time management
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Explore Interests and Create Broader Perspectives
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Participate in various co-curricular activities leading to their multifaceted personality development
8	VR19	05	B.Tech-Computer Science and Engineering	1000191202	Probability and Statistics	CO1	Elucidate the notion of random variable and evaluate the expected value and probability of random variables.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Apply Binomial, Poisson, Normal, gamma and weibull distributions for real data to compute probabilities, theoretical frequencies.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Evaluate the confidence levels and maximum error for large and small samples.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Analyze the concept of hypothesis testing for large and small samples in real life situations to draw the inferences and estimate the goodness of fit.
9	VR19	05	B.Tech-Computer Science and Engineering	1000191221	Applied Physics	CO1	Describe the wave phenomena and apply these concepts for construction of Lasers and optical fibers.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Apply the knowledge of basic quantum mechanics, to set up one-dimensional Schrodinger's wave equation
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Identify the importance of classical and quantum mechanical treatment of materials
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Make use of the basic concepts of energy bands in crystalline solids to understand semiconductor physics.
10	VR19	05	B.Tech-Computer Science and Engineering	1005191222	OOPS through C++	CO1	Understand the basic terminology used in object-oriented programming
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Describe the object-oriented programming approach in connection with C++
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Apply the concepts of object- oriented programming
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Apply virtual and pure virtual function & complex programming situations
11	VR19	05	B.Tech-Computer Science and Engineering	1004191200	Basic Electronics	CO1	Explain the basic concepts of Circuit theory, semiconductor physics and analyze the PN junction diode and special purpose diode.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Explain the BJT and FET and analyze various biasing techniques for BJT.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Design electronic circuit using logic gates
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Analyze basics working and principle of sensors

12	VR19	05	B.Tech-Computer Science and Engineering	1000191101	Mathematics-II	CO1	Solve approximate roots of an equation by using different numerical methods.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Compute Interpolating polynomial for the given data.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Constitute Numerical Solution of ODE and Numerical Integration.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Evaluate simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix.
13	VR19	05	B.Tech-Computer Science and Engineering	1005191210	IT Workshop	CO1	Assemble and disassemble components of a PC
	VR19	05	B.Tech-Computer Science and Engineering			CO2	utilize MS-office package
	VR19	05	B.Tech-Computer Science and Engineering			CO3	make use of linux operating system commands
	VR19	05	B.Tech-Computer Science and Engineering			CO4	intrepret cyber threats.
14	VR19	05	B.Tech-Computer Science and Engineering	1000191130	Constitution of India	CO1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Distinguish the power of state and central government.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Summarize the election procedure in India before and after independence
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Association with the powers and functions of Municipalities, Panchayats and Cooperative Societies.
15	VR19	05	B.Tech-Computer Science and Engineering	1005192100	Discrete Mathematical Structures	CO1	Demonstrate skills in solving counting problem
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Develop reasoning skills using Mathematical Logic concepts.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Identify the solutions for various problems using recurrence relations
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Apply concepts of graph theory for a given problem.
16	VR19	05	B.Tech-Computer Science and Engineering	1005192101	Digital Logic Design	CO1	Apply the principles of number system, binary codes and Boolean algebra to minimize logic expression
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Analyze functionality of digital circuits
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Design efficient combinational logic circuit implementations from functional description of digital systems
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Demonstrate the use of sequential circuits and storage elements in real-time applications.
17	VR19	05	B.Tech-Computer Science and Engineering	1005192120	Data structures through c	CO1	Apply the concept of linear and non-linear data structures to various applications
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Analyze and implement operations on linked lists and demonstrate their applications.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	implement stacks and queues using arrays and linked lists

	VR19	05	B.Tech-Computer Science and Engineering			CO4	develop programs by nonlinear data structures such as tree and graphs
18	VR19	05	B.Tech-Computer Science and Engineering	1005192121	Java Programming	CO1	Relate the procedural and object paradigm, with real world entities
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Use Exception handling and multithreading mechanisms to create efficient software application
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Implement GUI Applications with modern tools
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Design various layouts along with applet usage
19	VR19	05	B.Tech-Computer Science and Engineering	1099192100	Managerial Economics And Financial Analysis	CO1	Analyze the Demand, Price and Cost.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Identify the Nature of different markets to determine Price Output for different Business Units
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Understand Various Business Forms
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Evaluate investment project proposals
20	VR19	05	B.Tech-Computer Science and Engineering	1020192100	EMPLOYABILITY READINESS PROGRAM-1	CO1	Students have the adequate writing skills that are needed in an organization
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Understand the core competencies to succeed in professional and personal life
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Solve various Basic Mathematics problems by following different methods and to perform well in various competitive exams and placementdrives.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
21	VR19	05	B.Tech-Computer Science and Engineering	1020192101	PUBLIC ADMINISTRATION	CO1	Understand definition, scope, approach and theories of public administration.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Identify the process and technique of decision making and also understand the concept of administrative behaviour and control.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Understand the process and technique of personnel and financial administration.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Discuss the tools that modern public administrators use to pursue public goals and public policy, along with the pros and cons of those tools.
22	VR19	05	B.Tech-Computer Science and Engineering	1020192102	Foreign Linguistic - French	CO1	Students have the adequate reading and speaking skills and will be able to express himself in French.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Understand the grammar and use them in their personal and professional life.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Students will be able to write proficiently in French.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Studentswill be able to compare and contrast world culture and it will expand his knowledge about various culture.
	VR19	05	B.Tech-Computer Science and Engineering			CO1	Understand the various social problems present in the world & they will be able to identify and select a community problem to develop a technological

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

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

	VR19	05	B.Tech-Computer Science and Engineering			CO4	Analyze the concepts of file systems in operating systems
35	VR19	05	B.Tech-Computer Science and Engineering	1005193150	Programming Essentials in Python	CO1	Develop essential programming skills in computer programming concepts like data types, containers
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Apply the basics of programming in the Python language
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Solve coding tasks related OOPS, and Multithreading
36	VR19	05	B.Tech-Computer Science and Engineering	1005193151	Industrial Oriented Python Programming	CO1	Develop essential programming skills in computer programming concepts like data types, containers
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Apply the basics of programming in the Python language
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Solve coding tasks related OOPS, and Multithreading
37	VR19	05	B.Tech-Computer Science and Engineering	1005193152	Unix and Shell Programming	CO1	Explain the architecture and features of UNIX Operating System and differentiate it from other Operating Systems
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Demonstrate UNIX commands for file handling and process control
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Build Regular expressions for pattern matching and apply them to various filters for a specific task
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem
38	VR19	05	B.Tech-Computer Science and Engineering	1005193153	Computer Graphics	CO1	To understand the various computer graphics hardware and display technologies
	VR19	05	B.Tech-Computer Science and Engineering			CO2	To implement various type of scan conversion algorithms, line and polygon clipping algorithms.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	To apply different 2D and 3D transformation techniques & viewing technologies to real world problems
	VR19	05	B.Tech-Computer Science and Engineering			CO4	To understand the basic concepts of gaming theory
39	VR19	05	B.Tech-Computer Science and Engineering	1005193154	Advanced Computer Architecture	CO1	Understand Computational models and Computer Architectures.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Design and Analyze parallel computer models.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Understand Scalable Architectures, Pipelining.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Understand Superscalar processors and multiprocessors.
40	VR19	05	B.Tech-Computer Science and Engineering	1001193161	Industrial Waste and Waste	CO1	Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Impart knowledge on selection of treatment methods for industrial wastewater.

40	VR19	05	B.Tech-Computer Science and Engineering	1001193161	Waste Water Engineering	CO3	Describe the common methods of treatment in different industries
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Explain operational problems of common effluent treatment plant
41	VR19	05	B.Tech-Computer Science and Engineering	1002193151	Energy Audit Conservation and Management	CO1	Apply principles of energy auditing and propose energy conservation schemes.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Demonstrate principle and organizing energy management program.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Analyze power factor improvement methods, and Demonstrate the operating principle of energy efficient motors.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	To Analyze about space heating and ventilation methods and demonstrate the operation of various energy instruments.
	VR19	05	B.Tech-Computer Science and Engineering			CO5	Analyze and compute the economic aspects of energy consumption
42	VR19	05	B.Tech-Computer Science and Engineering	1003193161	Industrial Robotics	CO1	Identify various robot configuration and components
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Select appropriate actuators and sensors for a robot based on specific application
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Carry out kinematic and dynamic analysis for simple serial kinematic chains
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Perform trajectory planning for a manipulator by avoiding obstacles.
43	VR19	05	B.Tech-Computer Science and Engineering	1004193161	Data Communications	CO1	Understand the network layer architecture
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Learn about various digital modulation techniques.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Apply various errors correction and detection codes to digital data.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Learn about electromagnetic properties.,
44	VR19	05	B.Tech-Computer Science and Engineering	1005193110	Python Programming Lab	CO1	Develop essential programming skills in computer programming concepts like data types, containers
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Apply the basics of programming in the Python language
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Solve coding tasks related OOPS, and Multithreading
45	VR19	05	B.Tech-Computer Science and Engineering	1099193130	Professional Ethics & Human Values	CO1	Relate ethical human values
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Apply engineering knowledge for society
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Elaborate responsibility for safety & risk
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Outline the various current global issues

46	VR19	05	B.Tech-Computer Science and Engineering	1012193120	Computer Networks	CO1	Define Network and its components and Illustrate the functionality of OSI and TCP/IP reference models.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Compare different network layer protocols and Demonstrate various types of routing technique
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Evaluate Architecture for Application layer protocols.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Choose appropriate protocol for desired communication service.
47	VR19	05	B.Tech-Computer Science and Engineering	1005193200	Compiler Design	CO1	Acquire knowledge in different phases and passes of Compiler
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Understand Parser and its types i.e. Top-down and Bottom-up parsers.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Construct LL, SLR, CLR and LALR parse table.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Syntax directed translation, synthesized and inherited attributes and analyze techniques for code optimization
48	VR19	05	B.Tech-Computer Science and Engineering	1099192200	Management Science	CO1	Illustrate basic insights of management principles
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Summarize Production process, Quality control and Inventory techniques
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Indentify Strategies and policies to functional areas
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Apply Contemporary management Practices
49	VR19	05	B.Tech-Computer Science and Engineering	1005193250	Basics of Mathematics for Security	CO1	Understand the concepts and formula of number theory
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Understand the basic concepts of various algebraic structures and theorems like Euler's theorem for designing security algorithm.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Describe the basic concepts of coding theory which will be useful for data compression, information hiding
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Illustrate various pseudorandom number generation used for designing security protocols and for its analysis.
50	VR19	05	B.Tech-Computer Science and Engineering	1005193251	Artificial Intelligence	CO1	The student should be able to identify problems that are amenable to solution by AI methods.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	The student should be able to identify appropriate AI methods to solve a given problem.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
	VR19	05	B.Tech-Computer Science and Engineering			CO4	The student should have knowledge in expert system
51	VR19	05	B.Tech-Computer Science and Engineering	1005193252	Concurrent and Parallel Programming	CO1	Compare parallel programs and sequential programs
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Classify parallel computing platforms.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	List the parallel algorithm models.

	VR19	05	B.Tech-Computer Science and Engineering			CO4	Write shared memory parallel programs with openMP
52	VR19	05	B.Tech-Computer Science and Engineering	1005193253	Software Project Management	CO1	To understand the basic concepts and issues of software project management
	VR19	05	B.Tech-Computer Science and Engineering			CO2	To conduct activities necessary to successfully complete and close the Software projects
	VR19	05	B.Tech-Computer Science and Engineering			CO3	To implement the project plans through managing people, communications and change
	VR19	05	B.Tech-Computer Science and Engineering			CO4	To develop the skills for tracking and controlling software deliverables
53	VR19	05	B.Tech-Computer Science and Engineering	1005193254	Advanced Databases	CO1	Store data in the files and to implement indexing schemes for the fast retrieval of data
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Implement query complier, planner and executor
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Implement concurrency control protocols for transaction processing system
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Recovery techniques for recovering from transaction.
54	VR19	05	B.Tech-Computer Science and Engineering	1001193260	Environmental Impact Assessment and Management	CO1	Understand evaluate and create the basic concept of environmental impact assessment, Flow of EIA, Types of environmental Impacts
	VR19	05	B.Tech-Computer Science and Engineering			CO2	ImplementdifferentmethodsinpreparinganEnvironmentalImpactStatement
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Identify various mitigation measures that can be used.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Select methodology for identification of environmental impacts, environmental indices and indicators
55	VR19	05	B.Tech-Computer Science and Engineering	1004193161	Signal Processing	CO1	Design, simulate and realize different digital filters.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Estimate the spectra of signals that are to be processed by discrete time system and to verify the performance of various spectrum estimation techniques
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Design multi rate digital signal processing system.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Understand the architecture of DSP processor
56	VR19	05	B.Tech-Computer Science and Engineering	1019193261	Embedded System Design	CO1	Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Design the Embedded hardware by considering the hardware components required for an embedded system
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Analyze the various embedded firmware design approaches on embedded environment to suit for desired application
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Understand how to integrate hardware and firmware of an embedded system and apply this knowledge to real time operating system.
	VR19	05	B.Tech-Computer Science and Engineering			CO1	Students have the adequate writing skills that are needed in an organization and To perform well during Campus Drives and different Interviews
	VR19	05	B.Tech-Computer Science and Engineering		Employabili	CO2	Understand the core competencies to succeed in professional and personal life and Students will develop knowledge and experience with the use of the standard C programming language.

57	VR19	05	B.Tech-Computer Science and Engineering	1020193200	ty Readiness Program-III	CO3	Solve various Basic Mathematics problems by following different methods and analyses, summarize and present information in quantitative forms including table, graphs and formulas
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
58	VR19	05	B.Tech-Computer Science and Engineering	1005193210	Algorithms Lab	CO1	The ability to understand, analyze and develop computer programs in the areas related to algorithms.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	To find an algorithm to solve the problem and prove that the algorithm solves the problem correctly.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	To understand the mathematical criterion for deciding whether an algorithm is efficient.
59	VR19	05	B.Tech-Computer Science and Engineering	1005193270	Mini Project-II	CO1	apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Ability to perform individually as well as in a team, accepting responsibility, taking initiative, and providing leadership, necessary to ensure project
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Ability to use formal and informal communications with team members and guide, make presentations and prepare technical document.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems
60	VR19	05	B.Tech-Computer Science and Engineering	1005193280	Technical Seminar	CO1	Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of computer science and engineering.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Simulate and analyze the results reported in the chosen paper for seminar topic.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Communicate effectively before the expert panel and develop technical reports.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Respond to the queries raised by the evaluation committee and audience
61	VR19	05	B.Tech-Computer Science and Engineering	1005193280	Machine Learning	CO1	Appraise the importance of data and choose an appropriate algorithm to create a models
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervised
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Relate various machine learning and deep learning algorithms with real world applications
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Analyze how to evaluate models build from the sample datasets on web
62	VR19	05	B.Tech-Computer Science and Engineering	1005194100	Big Data Analytics	CO1	Relate different aspects of BigData in accordance with various big data applications
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Catergorize various dimensions of BigData (5V's) and its sources in real time
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Make use of recent tools related to Hadoop, Spark and MapReduce etc
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Analyze the different aspects of cluster computing with real world applications

63	VR19	05	B.Tech-Computer Science and Engineering	1005194121	Object Oriented Analysis and Design using UML	CO1	Build solutions to the complex problems using object oriented approach
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Identify classes and responsibilities of the problem domain
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Apply UML tools for various case studies
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Represent classes, objects, responsibilities and states using UML notations.
64	VR19	05	B.Tech-Computer Science and Engineering	1005193263	Cryptography and Network Security (PE-III)	CO1	Identify basic security attacks and services
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Analyze the strengths and weaknesses of various symmetric encryption algorithms.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Apply the concepts of number theory and public key algorithms in cryptography
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Classify various cryptographic protocols, hash functions, digital signature schemes
65	VR19	05	B.Tech-Computer Science and Engineering	1005194150	Artificial Neural Networks (PE-III)	CO1	Demonstrate ANN structure and activation Functions.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Define foundations and learning mechanisms and state-space concepts.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Explain multi-layer feed forward networks and Back propagation algorithms.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Analyze Radial Basis Function Networks and SVMs
66	VR19	05	B.Tech-Computer Science and Engineering	1005194151	Advanced Computer Networks (PE-III)	CO1	Enumerate the layers of the OSI model and TCP/IP model. Explain the function(s) of each layer. Ability to understand about different architectures network.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Identify the different types of network devices and their functions within a network.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	build the skills to inter work with sub netting, routing mechanisms and transport layer protocols.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Select appropriate quality of service mechanism for a given computer network
67	VR19	05	B.Tech-Computer Science and Engineering	1005194152	Software Architecture and Design Patterns (PE-III)	CO1	Create, classify and build the software architecture
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Illustrate and evaluate the architecture structures
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Design creational and structural patterns
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Outline behavioural pattern and case study in uitlizing the software architectural structures
68	VR19	05	B.Tech-Computer Science and Engineering	1005194153	Distributed Systems (PE-III)	CO1	Illustrate the basic elements and concepts related to distributed system technologies
	VR19	05	B.Tech-Computer Science and Engineering			CO2	List the characteristics of distributed systems for designing architectural models
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Enumerate the features and applications of important standard protocols which are used in the distributed system

	VR19	05	B.Tech-Computer Science and Engineering			CO4	Interpret inter-process communication in a distributed system
69	VR19	05	B.Tech-Computer Science and Engineering	1005194154	Cloud Computing (PE-IV)	CO1	apply the knowledge of cloud technology to infer the working principles of cloud computing
	VR19	05	B.Tech-Computer Science and Engineering			CO2	analyse cloud services extended by various cloud providers to build a cloud
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Identify emerging cloud programming paradigms and its software environments
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Design and develop the backup strategies for cloud data by pridcting the future risks
70	VR19	05	B.Tech-Computer Science and Engineering	1005194155	Pattern Recognition (PE-IV)	CO1	elucidate the parametric and linear models of classification in domain specific applications
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Compare and parameterize different learning algorithms in NLP applications
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Develop machine independent and unsupervised learning techniques.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Apply pattern recognition techniques to real world problems such as documentation analysis and recognition
71	VR19	05	B.Tech-Computer Science and Engineering	1005194156	Mobile Adhoc Networks (PE-IV)	CO1	develop new applications in Manets and WSN.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	enable the student to understand the need for security and the challenges and also the role of cross layer design in enhancing the network performance
	VR19	05	B.Tech-Computer Science and Engineering			CO3	develop algorithms/protocols for Manets and WSN.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	examine new technical issue related to these new thrust areas and come up with a solution(s).
72	VR19	05	B.Tech-Computer Science and Engineering	1005194157	Software Testing Methodologies	CO1	Figure out practical solutions to the problems for various applications
	VR19	05	B.Tech-Computer Science and Engineering			CO2	formulate and analyze test cases for given problem domain
	VR19	05	B.Tech-Computer Science and Engineering			CO3	manage test plans and test models for projects from inception to transition
	VR19	05	B.Tech-Computer Science and Engineering			CO4	find out the implementation of different strategies to replace errors
73	VR19	05	B.Tech-Computer Science and Engineering	1005194158	Mern Stack Technologies (PE-IV)	CO1	make use of HTML5, CSS, JavaScript and Bootstrap.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Implement a Fast, unopinionated, minimalist web framework for Node.js using Express
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Develop MongoDB-a schema-less (document-oriented) NoSQL database
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Build and deploy a social network with Node.js
74	VR19	05	B.Tech-Computer Science and Engineering	1005194160	Disaster Manageme	CO1	know the basic concepts in Disasters and its triggering factures
	VR19	05	B.Tech-Computer Science and Engineering			CO2	understand stages of hydrological disaster

74	VR19	05	B.Tech-Computer Science and Engineering	1001194100	Management (OE-IV)	CO3	analysis the causes, effects, impacts and of hydrological, geological and coastal hazards.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	understand the mitigation procedure of uncertain events
75	VR19	05	B.Tech-Computer Science and Engineering	1003193252	Operations Research (OE-IV)	CO1	formulate and solve various practical problems in manufacturing and service organizations.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	solve the allocation models
	VR19	05	B.Tech-Computer Science and Engineering			CO3	perform iterations in the Transportation, assignment, game, inventory problems
	VR19	05	B.Tech-Computer Science and Engineering			CO4	perform iterations in the replacement, sequencing, queuing problems
76	VR19	05	B.Tech-Computer Science and Engineering	1004193252	Digital Image Processing (OE-IV)	CO1	Explain the fundamentals of gray scale and color image processing.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Apply different compression methods on image for image processing applications.
	VR19	05	B.Tech-Computer Science and Engineering			CO3	Solve the methods to extract information from the image in terms of spatial filtering, frequency filtering, restoration and segmentation.
	VR19	05	B.Tech-Computer Science and Engineering			CO4	Examine the different techniques of color and multi resolution processing.
77	VR19	05	B.Tech-Computer Science and Engineering	1019103260	Internet of Things (OE IV)	CO1	Understand the Architecture, protocols and applications of IoT.
	VR19	05	B.Tech-Computer Science and Engineering			CO2	Analyse the communication protocols and standards used in IoT
	VR19	05	B.Tech-Computer Science and Engineering			CO3	design the simple IoT applications to monitor or control IoT devices using simulation or hardware
	VR19	05	B.Tech-Computer Science and Engineering			CO4	implement the real time IoT applications.

PRINCIPAL
VIGNAN'S INSTITUTE OF
Information Technology (A)
side: VSEZ, Duvvada, Visakhapatnam-49

VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY (A)
DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE OUTCOMES

S.No	Regulation	Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
1	VR19	12	B.Tech-Information Technology	1000191100	MATHEMATICS – I	CO1	Executing mean value theorems and evaluate maxima and minima of functions of two variables without constraints
	VR19	12	B.Tech-Information Technology			CO2	Apply the analytical methods to solve higher order linear differential equations.
	VR19	12	B.Tech-Information Technology			CO3	Evaluate of solution of Ordinary differential equations by using Laplace Transform technique.
	VR19	12	B.Tech-Information Technology			CO4	Identify and solve partial differential equations.
2	VR19	12	B.Tech-Information Technology	1000191123	APPLIED CHEMISTRY	CO1	Identification of different polymers and their functionalities
	VR19	12	B.Tech-Information Technology			CO2	Determination of structure to many compounds and apply the basic knowledge in construction of cell and its applications
	VR19	12	B.Tech-Information Technology			CO3	Analysis of corrosive environments and protection of precious metal
	VR19	12	B.Tech-Information Technology			CO4	Adoption of different green methodologies and acquire knowledge on different advanced materials
3	VR19	12	B.Tech-Information Technology	1003191101	ENGINEERING DRAWING	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR19	12	B.Tech-Information Technology			CO2	Learn the principles of orthographic projections. Draw Orthographic projections of points, lines.
	VR19	12	B.Tech-Information Technology			CO3	Draw the various types of planes and solids its views in different Positions
	VR19	12	B.Tech-Information Technology			CO4	Draw isometric views of simple objects
4	VR19	12	B.Tech-Information Technology	1005191120	PROBLEM SOLVING AND PROGRAMMING USING C	CO1	Interpret fundamentals of computers and convert flow charts/algorithms to C Programs, compile and debug programs
	VR19	12	B.Tech-Information Technology			CO2	Apply decision making and looping feature of C Programming language effectively.
	VR19	12	B.Tech-Information Technology			CO3	Design and implement programs to analyze the different pointer applications
	VR19	12	B.Tech-Information Technology			CO4	Apply structures and unions and Implement file Operations in C programming for any given problem
5	VR19	12	B.Tech-Information Technology	1000191121	TECHNICAL ENGLISH COMMUNICATION	CO1	Read, understand and interpret material on Environment, Science and Technology, tourism, Energy Sources, Social Awareness
	VR19	12	B.Tech-Information Technology			CO2	Analyze the functions of language and grammar in spoken and written forms
	VR19	12	B.Tech-Information Technology			CO3	Write effectively [illegible]s.
	VR19	12	B.Tech-Information Technology			CO4	Prepare and exhibit oral presentation skills by using ICT(Individual/Team)
6	VR19	12	B.Tech-Information Technology	1000191110	Engineering Exploration	CO1	Realize the purpose/Role of Engineer for solving social problems
	VR19	12	B.Tech-Information Technology			CO2	Learn to Design a component/system in an engineering way
	VR19	12	B.Tech-Information Technology			CO3	Learn to use mechanisms, Arduino, sensors, motors.
	VR19	12	B.Tech-Information Technology			CO4	Integrating different systems (mechanical/Electrical/computer) to work as a unit
8	VR19	12	B.Tech-Information Technology	1000191101	MATHEMATICS – II	CO1	Solve approximate roots of an equation by using different numerical methods.
	VR19	12	B.Tech-Information Technology			CO2	Compute Interpolating polynomial for the given data.
	VR19	12	B.Tech-Information Technology			CO3	Constitute Numerical Solution of ODE and Numerical Integration.
	VR19	12	B.Tech-Information Technology			CO4	Evaluate simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix.

9	VR19	12	B.Tech-Information Technology	1000191221	APPLIED PHYSICS	CO1	describe the wave phenomen and applu thesse concepts for construction of lasers and optical fibers .
	VR19	12	B.Tech-Information Technology			CO2	apply the knowledge of basic quantum mechanics, to set up one deimesional schrodingers wave equatiion
	VR19	12	B.Tech-Information Technology			CO3	identify the importance if classical and quantum
	VR19	12	B.Tech-Information Technology			CO4	male use od the basic comcepts of energy bands in ctystalline solids to undestsnd semiconductor physics .
10	VR19	12	B.Tech-Information Technology	1005191222	OOPSTHROUGH C++ OBJECT-ORIENTED PROGRAMMING	CO1	Relate the procedural and object paradigm, streams, classes, functions, data and objects with real world entities
	VR19	12	B.Tech-Information Technology			CO2	Apply the concepts of function overloading, operator overloading ,virtual functions and polymorphism
	VR19	12	B.Tech-Information Technology			CO3	classify inheritance with understanding of early and late binding.
	VR19	12	B.Tech-Information Technology			CO4	solve the critical order problems using STL and Generic Programming
11	VR19	12	B.Tech-Information Technology	1004191200	BASIC ELECTRONICS	CO1	Explain the basic concepts of Circuit theory, semiconductor physics and analyze the PN junction diode and special purpose diode.
	VR19	12	B.Tech-Information Technology			CO2	Explain the BJT and FET and analyze various biasing techniques for BJT.
	VR19	12	B.Tech-Information Technology			CO3	Design electronic circuit using logic gates
	VR19	12	B.Tech-Information Technology			CO4	Analyze basics working and principle of sensors
12	VR19	12	B.Tech-Information Technology	1000191202	PROBABILITY AND STATISTICS (Only for CSE& IT)	CO1	Elucidate the notion of random variable and evaluate the expected value and probability of random variables.
	VR19	12	B.Tech-Information Technology			CO2	Apply Binomial, Poisson, Normal, gamma and Weibull distributions for real data to compute probabilities, theoretical frequencies.
	VR19	12	B.Tech-Information Technology			CO3	Evaluate the confidence levels and maximum error for large and small samples
	VR19	12	B.Tech-Information Technology			CO4	Analyze the concept of hypothesis testing for large and small samples in real life situations to draw the inferences and estimate the goodness of fit.
13	VR19	12	B.Tech-Information Technology	1005191210	IT Workshop	CO1	Assemble and disassemble components of a PC
	VR19	12	B.Tech-Information Technology			CO2	Construct a fully functional virtual machine
	VR19	12	B.Tech-Information Technology			CO3	Summarize various linux operating system commands
	VR19	12	B.Tech-Information Technology			CO4	Secure a computer from cyber threats.
14	VR19	12	B.Tech-Information Technology	1000191130	CONSTITUTION OF INDIA	CO1	Have general knowledge and legal literacy and therel
	VR19	12	B.Tech-Information Technology			CO2	Distinguish the power of state and central central governament
	VR19	12	B.Tech-Information Technology			CO3	Summarize theelection procedure in India before and after independence
	VR19	12	B.Tech-Information Technology			CO4	Association with the powers and functions of Munic
15	VR19	12	B.Tech-Information Technology	1005192100	DISCRETE MATHEMATICAL STRUCTURES	CO1	Demonstrate skills in solving counting problem
	VR19	12	B.Tech-Information Technology			CO2	Develop reasoning skills using Mathematical Logic concepts.
	VR19	12	B.Tech-Information Technology			CO3	Identify the solutions for various problems using recurrence relations

	VR19	12	B.Tech-Information Technology			CO4	Apply concepts of graph theory for a given problem.
16	VR19	12	B.Tech-Information Technology	1005192101	DIGITAL LOGIC DESIGN	CO1	classify different number systems and generate various codes.
	VR19	12	B.Tech-Information Technology			CO2	Simplify the Boolean functions into minimum number of literals using k-maps, boolean laws and tabular methods.
	VR19	12	B.Tech-Information Technology			CO3	Design different combinational logic circuits.
	VR19	12	B.Tech-Information Technology			CO4	Apply knowledge of flip flops in designing registers and counters.
17	VR19	12	B.Tech-Information Technology	1005192120	DATA STRUCTURES THROUGH C	CO1	Relate data structure concepts with real time applications.
	VR19	12	B.Tech-Information Technology			CO2	Apply linear and non linear data structures by identifying the appropriate need.
	VR19	12	B.Tech-Information Technology			CO3	Analyze searching and sorting techniques for effective management of data
	VR19	12	B.Tech-Information Technology			CO4	Design and implement operations of linear and nonlinear data structures
18	VR19	12	B.Tech-Information Technology	1005192121	JAVA PROGRAMMING	CO1	Relate the procedural programming languages with object oriented paradigm
	VR19	12	B.Tech-Information Technology			CO2	Use Exception handling and multithreading mechanisms to create exception free and parallel real world applications
	VR19	12	B.Tech-Information Technology			CO3	Implement GUI for windows based applications with modern tools
	VR19	12	B.Tech-Information Technology			CO4	Design various layouts along with applet usage
19	VR19	12	B.Tech-Information Technology	1099192100	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	CO1	Analyze the Demand, Price and Cost.
	VR19	12	B.Tech-Information Technology			CO2	Identify the Nature of different markets to determine Price Output for different Business Units
	VR19	12	B.Tech-Information Technology			CO3	Understand Various Business Forms
	VR19	12	B.Tech-Information Technology			CO4	Evaluate investment project proposals
20	VR19	12	B.Tech-Information Technology	1020192100	EMPLOYABILITY READINESS PROGRAM-I	CO1	Produce adequate writing skills that are needed in an organization
	VR19	12	B.Tech-Information Technology			CO2	Evaluate the core competencies to succeed in professional and personal life
	VR19	12	B.Tech-Information Technology			CO3	Solve various mathematics problems by following different methods and to perform well in various competitive exams and placement drives.
	VR19	12	B.Tech-Information Technology			CO4	Developing new strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
21	VR19	12	B.Tech-Information Technology	1020192101	PUBLIC ADMINISTRATION	CO1	Understand definition, scope, approach and theories of public administration.
	VR19	12	B.Tech-Information Technology			CO2	Identify the process and technique of decision making and also understand the concept of administrative behaviour and control.
	VR19	12	B.Tech-Information Technology			CO3	Understand the process and technique of personnel and financial administration.
						c04	Understand definition, scope, approach and theories of public administration.
	VR19	12	B.Tech-Information Technology			c05	Discuss the tools that modern public administrators use to pursue public goals and public policy, along with the pros and cons of those tools.
	VR19	12	B.Tech-Information Technology			CO1	Students have the adequate reading and speaking skills and will be able to express himself in French.

22	VR19	12	B.Tech-Information Technology	1020192102	FOREIGN LINGUISTIC - FRENCH	CO2	Understand the grammar and use them in their personal and professional life.
	VR19	12	B.Tech-Information Technology			CO3	Students will be able to write proficiently in French.
	VR19	12	B.Tech-Information Technology			CO4	Students will be able to compare and contrast world culture and it will expand his knowledge about various culture.
23	VR19	12	B.Tech-Information Technology	1012192170	Mini Project – 1 EPICS/Societal relevant project	CO1	Survey various social problems present in the viscinity & develop solution in technical aspects.
	VR19	12	B.Tech-Information Technology			CO2	Compare and contrast various latest technologies like Internet of Things, 3D Printing, Mobile App Creation, Thinker CAD, and Web page development suitable for the chosen project.
	VR19	12	B.Tech-Information Technology			CO3	Apply the engineering knowledge, mathematics, design thinking and project management to develop a community project.
	VR19	12	B.Tech-Information Technology			CO4	Document project to the intended community and analyze the feedback collected from community and extend any kind of support in future by the students.
24	VR19	12	B.Tech-Information Technology	1000192130	ENVIRONMENTAL SCIENCE (Audit Course)	CO1	Gain a higher level of personal involvement and interest in understanding and solving environmental resource problems and its sustainable conservation practices.
	VR19	12	B.Tech-Information Technology			CO2	Sustaining the relationship between man and ecosystem & biodiversity.
	VR19	12	B.Tech-Information Technology			CO3	Enhance knowledge relating to the biological systems involved in the major global environmental problems of the 21st century
	VR19	12	B.Tech-Information Technology			CO4	Recognize the interconnectedness of human dependence on the earth's ecosystems and Influence their society in proper utilization of goods and services.
25	VR19	12	B.Tech-Information Technology	1005192200	Computer Organization & Architecture	CO1	Apply the concepts of basic functional units to demonstrate the working of computational system.
	VR19	12	B.Tech-Information Technology			CO2	analyze the design issues in the development of processor and other components to articulate improvement in computer design.
	VR19	12	B.Tech-Information Technology			CO3	Design Arithmetic Logic unit by analyzing performance issues
	VR19	12	B.Tech-Information Technology			CO4	Compare various Memory organizations.
26	VR19	12	B.Tech-Information Technology	1005192201	SOFTWARE ENGINEERING	CO1	compare and contrast various software models applied to different real world applications.
	VR19	12	B.Tech-Information Technology			CO2	evaluate the process models for the development of SDLC
	VR19	12	B.Tech-Information Technology			CO3	Design a prototype for a software design and user interface & apply strategies of coding & testing for the development of software product
	VR19	12	B.Tech-Information Technology			CO4	Apply the knowledge about cost effect estimation and maintenance of software system and modeling the software project by using CASE tools
	VR19	12	B.Tech-Information Technology		AUTOMATA THEORY	CO1	Apply the basic concepts of Languages, operations of Languages, NFA, DFA and its conversions.
	VR19	12	B.Tech-Information Technology			CO2	Identify the similarities and differences among various parsing techniques and will be able to solve problems related to Shift reduce parsing, compute FIRST and FOLLOW sets, LR(0), LR(1) and LALR sets of items and parse table for a given grammar

27	VR19	12	B.Tech-Information Technology	1012192200	THEORY & COMPILER DESIGN	CO3	Construct syntax directed translations of simple statements and understand the working of procedure calls and use various storage allocation schemes for the better utilization of run time memory.
	VR19	12	B.Tech-Information Technology			CO4	Construct syntax directed translations of simple statements and understand the working of procedure calls and use various storage allocation schemes for the better utilization of run time memory.
28	VR19	12	B.Tech-Information Technology	1005192221	DATABASE MANAGEMENT SYSTEMS	CO1	identify the basic concepts and various data model used in database design and formulate SQL queries.
	VR19	12	B.Tech-Information Technology			CO2	interpret use of normalization in designing the database.
	VR19	12	B.Tech-Information Technology			CO3	evaluate indexing and hashing technique used in database design.
	VR19	12	B.Tech-Information Technology			CO4	apply and relate the concept of transaction, concurrency control and recovery in database.
29	VR19	12	B.Tech-Information Technology	1012192120	PYTHON PROGRAMMING	CO1	Enumerate different environments to install Python IDE and run basic Python scripts.
	VR19	12	B.Tech-Information Technology			CO2	Ascertain use the operators, functions, key Concepts of Object Oriented Programming in python.
	VR19	12	B.Tech-Information Technology			CO3	Access Python from various online resources and import packages to the current working environment.
	VR19	12	B.Tech-Information Technology			CO4	Develop front end GUI using Visualization Libraries and Multithreading techniques.
30	VR19	12	B.Tech-Information Technology	1000192110	COMMUNICATION SKILLS LAB	CO1	: Analyze the functions of language and grammar in spoken and written forms with an emphasis on LSRW Skills.
	VR19	12	B.Tech-Information Technology			CO2	Disseminate the relevant skills while performing GDs, interviews, oral presentations with a focus on Non verbal communication.
	VR19	12	B.Tech-Information Technology			CO3	Prepare and exhibit oral presentation skills by using ICT.(Individual/Team)
	VR19	12	B.Tech-Information Technology			CO4	Organize proper life skills for their employability.
31	VR19	12	B.Tech-Information Technology	1005192220	Advanced Data Structures	CO1	Analyze dictionary ADT along with hashing mechanisms.
	VR19	12	B.Tech-Information Technology			CO2	implement priority queues and their operations.
	VR19	12	B.Tech-Information Technology			CO3	Build efficient Binary Search Trees and Multiway search trees.
	VR19	12	B.Tech-Information Technology			CO4	Illustrate tries and various issues related to the design of file structures.
32	VR19	12	B.Tech-Information Technology	1005193101	Data Warehousing and Data Mining	CO1	Identify stages in building a Data Warehouse and challenges in Data mining
	VR19	12	B.Tech-Information Technology			CO2	Access raw input data and apply data pre-processing techniques, generalization techniques and data characterization techniques to provide suitable input for a range of data mining algorithms
	VR19	12	B.Tech-Information Technology			CO3	Analyze data mining techniques like classification and Association rules that can be applied to data objects and to find the interesting patterns.
	VR19	12	B.Tech-Information Technology			CO4	Solve real world problems by using the various Clustering methods
	VR19	12	B.Tech-Information Technology			CO1	compare and illustrate functionality of OSI and TCP/IP reference models.

33	VR19	12	B.Tech-Information Technology	1012193120	Computer Networks (Integrated Course)	CO2	select and evaluate appropriate routing techniques among network protocols.
	VR19	12	B.Tech-Information Technology			CO3	Evaluate and analyze various application layer protocols.
	VR19	12	B.Tech-Information Technology			CO4	Choose and design appropriate protocol for desired communication service.
34	VR19	12	B.Tech-Information Technology	1005193102	Operating Systems	CO1	Categorize and assess various types of operating systems and execution of system calls at each phase.
	VR19	12	B.Tech-Information Technology			CO2	Analyze various process scheduling and memory management techniques to develop better solutions.
	VR19	12	B.Tech-Information Technology			CO3	Formulate dead lock management, resource management techniques and IPC abstraction.
	VR19	12	B.Tech-Information Technology			CO4	perform tasks in Windows/ UNIX / Linux /Android and other environments.
35	VR19	12	B.Tech-Information Technology	1012193150	Principles of Programming Languages (Professional Elective-I)	CO1	Recognize syntax and semantics of programming languages.
	VR19	12	B.Tech-Information Technology			CO2	Comprehend the list of variables, data types, and basic statements in programming languages.
	VR19	12	B.Tech-Information Technology			CO3	Analyze to understand the sub programs and implementation of Object oriented concepts.
	VR19	12	B.Tech-Information Technology			CO4	Identify the ways of adapt new programming languages.
36	VR19	12	B.Tech-Information Technology	1012193151	NoSQL Databases (Professional Elective-I)	CO1	Classify NoSQL, its characteristics and history, and the primary benefits for using NoSQL databases
	VR19	12	B.Tech-Information Technology			CO2	Characterize the major types of NoSQL databases including a primary use case and advantages/disadvantages of each type
	VR19	12	B.Tech-Information Technology			CO3	Create wide-column, document, key-value, graph and object-oriented databases, add content, and run queries
	VR19	12	B.Tech-Information Technology			CO4	Outline and develop basic storage architecture and distributed file systems
37	VR19	12	B.Tech-Information Technology	1012193152	R-Programming (Professional Elective-I)	CO1	Familiarize with R workspace and Programming with R
	VR19	12	B.Tech-Information Technology			CO2	Access online resources for R and import new function packages into the R workspace
	VR19	12	B.Tech-Information Technology			CO3	Apply math functions to calculate probability and statistical distributions and knowledge on Graphics in data visualization.
	VR19	12	B.Tech-Information Technology			CO4	Analyze the datasets using various models like linear, non-linear regression models, and classification techniques for data analysis
38	VR19	12	B.Tech-Information Technology	1005193154	Advanced Computer Architecture (Professional Elective-I)	CO1	analyze concepts of parallelism in hardware/software.
	VR19	12	B.Tech-Information Technology			CO2	Implement the Hardware for Arithmetic Operation
	VR19	12	B.Tech-Information Technology			CO3	Distinguish the performance of pipelining and non pipelining environment in a processor
	VR19	12	B.Tech-Information Technology			CO4	Analyze the performance of different scalar Computers
39	VR19	12	B.Tech-Information Technology	1001193161	INDUSTRIAL WASTE AND WASTE WATER ENGINEERING (Open	CO1	Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation
	VR19	12	B.Tech-Information Technology			CO2	Impart knowledge on selection of treatment methods for industrial wastewater.
	VR19	12	B.Tech-Information Technology			CO3	Describe the common methods of treatment in different industries
	VR19	12	B.Tech-Information Technology			CO4	Explain operational problems of common effluent treatment plant
	VR19	12	B.Tech-Information Technology			CO1	Summarize robot components, configurations and different end effectors

40	VR19	12	B.Tech-Information Technology	1003193161	INDUSTRIAL ROBOTICS (Open Elective)	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
	VR19	12	B.Tech-Information Technology			CO3	Analyze a given serial manipulator kinematically and dynamically
	VR19	12	B.Tech-Information Technology			CO4	Derive as well as analyze the equation of trajectory that the end-effector should follow given the boundary conditions
41	VR19	12	B.Tech-Information Technology	1004193161	DATA COMMUNICATIONS (Open Elective)	CO1	Interpret ISO-OSI and TCP/IP models and various Network topology models
	VR19	12	B.Tech-Information Technology			CO2	Illustrate the concept of data framing and error control mechanisms
	VR19	12	B.Tech-Information Technology			CO3	Compare different types routing protocols
	VR19	12	B.Tech-Information Technology			CO4	Familiar with the World Wide Web concept
42	VR19	12	B.Tech-Information Technology	1002193151	Energy Audit Conservation and Management (Open Elective)	CO1	Analyze power factor improvement methods, and Demonstrate the operating principle of energy efficient motors
	VR19	12	B.Tech-Information Technology			CO2	Demonstrate principle and organizing energy management program
	VR19	12	B.Tech-Information Technology			CO3	Apply principles of energy auditing and propose energy conservation schemes
	VR19	12	B.Tech-Information Technology			CO4	analyse about space heating and ventilation methods and demonstrate the operation of various energy instruments
43	VR19	12	B.Tech-Information Technology	1099193130	Professional Ethics & Human Values (Audit Course)	CO1	Relate ethical human values
	VR19	12	B.Tech-Information Technology			CO2	Apply engineering knowledge for society
	VR19	12	B.Tech-Information Technology			CO3	Elaborate responsibility for safety & risk
	VR19	12	B.Tech-Information Technology			CO4	Outline the various current global issues
44	VR19	12	B.Tech-Information Technology	1012193220	Advanced Java Web Technologies (Integrated Course)	CO1	Create web-based applications using features of HTML and CSS.
	VR19	12	B.Tech-Information Technology			CO2	Develop reusable component for Graphical User Interface applications
	VR19	12	B.Tech-Information Technology			CO3	Apply the concepts of server side technologies for dynamic web applications.
	VR19	12	B.Tech-Information Technology			CO4	Implement the web based applications using effective data base access with rich client interaction.
45	VR19	12	B.Tech-Information Technology	1012193221	Unified Modeling Language & Design Patterns (Integrated Course)	CO1	Illustrate software design with UML diagrams
	VR19	12	B.Tech-Information Technology			CO2	Design software applications using OO concepts
	VR19	12	B.Tech-Information Technology			CO3	Identify various scenarios based on software requirements
	VR19	12	B.Tech-Information Technology				Apply UML based software design into pattern based design using design patterns
46	VR19	12	B.Tech-Information Technology	Course Code : 1099192200	Management Science		insights f man ent principles
	VR19	12	B.Tech-Information Technology			CO2	Summarize Production process, Quality control and Inventory techniques
	VR19	12	B.Tech-Information Technology			CO3	Indentify Strategies and policies to functional areas
	VR19	12	B.Tech-Information Technology			CO4	Apply Contemporary management Practices
47	VR19	12	B.Tech-Information Technology	1001193251	ENVIRONMENTAL IMPACT ASSESSMENT AND	CO1	Understand and assess the environmental impact
	VR19	12	B.Tech-Information Technology			CO2	Implement different methods in preparing Environmental Impact Statement
	VR19	12	B.Tech-Information Technology			CO3	Identify various mitigation measures that can be used

	VR19	12	B.Tech-Information Technology		MANAGEMENT	CO4	Identify the methodology for controlling of environmental impacts, environmental indices and indicators
48	VR19	12	B.Tech-Information Technology	1012194100	Applied Cryptography	CO1	Apply the principles and practices of cryptography and network security
	VR19	12	B.Tech-Information Technology			CO2	Analyze the concepts of symmetric block cipher or conventional key encryption or private key encryption or one key encryption.
	VR19	12	B.Tech-Information Technology			CO3	Execute basic knowledge of public key cryptography or asymmetric key cryptography or two key cryptography.
	VR19	12	B.Tech-Information Technology			CO4	Implement cryptographic protocols, hash functions, authentication, key management, key exchange, signature, schemes Email and web security, viruses, firewalls
49	VR19	12	B.Tech-Information Technology	1005194120	Machine Learning (Integrated Course)	CO1	Appraise the importance of data and choose an appropriate algorithm to create a models
	VR19	12	B.Tech-Information Technology			CO2	Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervi
	VR19	12	B.Tech-Information Technology			CO3	Relate various machine learning and deep learning algorithms with real world application
	VR19	12	B.Tech-Information Technology			CO4	Analyze how to evaluate models build from the sample datasets on web
50	VR19	12	B.Tech-Information Technology	1005194100	Big Data Analytics	CO1	Relate different aspects of BigData in accordance with various big data applications
	VR19	12	B.Tech-Information Technology			CO2	Catergorize various dimensions of BigData (5V's) and its sources in real time
	VR19	12	B.Tech-Information Technology			CO3	Make use of recent tools related to Hadoop, Spark and MapReduce etc
	VR19	12	B.Tech-Information Technology			CO4	Analyze the different aspects of cluster computing with real world applications
51	VR19	12	B.Tech-Information Technology	1012194150	Software Testing (Professional Elective-III)	CO1	Reproduce models to effectively test the applications.
	VR19	12	B.Tech-Information Technology			CO2	Apply techniques of transaction flow testing and dataflow testing in various programs
	VR19	12	B.Tech-Information Technology			CO3	Test the software using domain testing and Logic Based Testing
	VR19	12	B.Tech-Information Technology			CO4	Apply various software testing tools for real world applications
52	VR19	12	B.Tech-Information Technology	1005193254	Advanced Databases (Professional Elective-III)	CO1	choose appropriate techniques to Store data in the files
	VR19	12	B.Tech-Information Technology			CO2	Apply and analyze various terms related to transaction management in centralized and distributed database
	VR19	12	B.Tech-Information Technology			CO3	Examine the issues related to multimedia and mobile database performance
	VR19	12	B.Tech-Information Technology			CO4	Analyze and Implement the concept of object-relational database in development of various real time software
53	VR19	12	B.Tech-Information Technology	1005193251	Artificial Intelligence (Professional Elective-III)	CO1	Choose appropriate methods in AI that may be suited to solve a given problem and Game Playing
	VR19	12	B.Tech-Information Technology			CO2	Make use of AI search algorithms and formalizations on real world problems
	VR19	12	B.Tech-Information Technology			CO3	Analyze the basic issues of different types of knowledge representation techniques to build intelligent system
	VR19	12	B.Tech-Information Technology			CO4	Apply probabilistic and fuzzy models to solve problems with uncertainty.
54	VR19	12	B.Tech-Information Technology	1012194151	Mobile Computing (Professional Elective-III)	CO1	Analyze, design and develop new mobile application.
	VR19	12	B.Tech-Information Technology			CO2	Apply various techniques that take new technical issue related to a new paradigm and come up with a solution(s).
	VR19	12	B.Tech-Information Technology			CO3	Create a new ad hoc network applications and/or algorithms/protocols.

	VR19	12	B.Tech-Information Technology			CO4	Design and develop any existing or new protocol related to mobile environment
55	VR19	12	B.Tech-Information Technology	1012194152	UNIX Programming (Professional Elective-IV)	CO1	Extract architecture and features of UNIX Operating System and differentiate it from other Operating Systems
	VR19	12	B.Tech-Information Technology			CO2	Use of UNIX commands for various file handling and process control strategies.
	VR19	12	B.Tech-Information Technology			CO3	Build Regular expressions for pattern matching and apply them to various filters for a specific task
	VR19	12	B.Tech-Information Technology			CO4	Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem
56	VR19	12	B.Tech-Information Technology	1012194153	Full Stack Development (MERN) (Professional Elective-IV)	CO1	Execute basic concepts of react,node, express and mongodb technologies
	VR19	12	B.Tech-Information Technology			CO2	Design front end application using React and Redux libraries
	VR19	12	B.Tech-Information Technology			CO3	Develop interactive web applications on server side with NOSQL databases.
	VR19	12	B.Tech-Information Technology			CO4	Build responsive web application communicating with RES API and managing data with NOSQL databases
57	VR19	12	B.Tech-Information Technology	1012194154	Cyber Security & Forensics (Professional Elective-IV)	CO1	Enumerate the computer forensics fundamentals
	VR19	12	B.Tech-Information Technology			CO2	compare and contrast the types of computer forensics technology
	VR19	12	B.Tech-Information Technology			CO3	CO3 Analyze various computer forensics systems used at various levels
	VR19	12	B.Tech-Information Technology			CO4	Illustrate the methods for data recovery, evidence collection and data seizure
58	VR19	12	B.Tech-Information Technology	1005193253	Software Project Management (Professional Elective-IV)	CO1	Examine how software devlopment life cycle models can impact the software deliverables
	VR19	12	B.Tech-Information Technology			CO2	conduct activities necessary to successfully complete and close the Software projects
						c04	develop the skills for tracking and controlling software deliverables
	VR19	12	B.Tech-Information Technology			CO3	Estimate the effort required for a software project development and identify software risks
59	VR19	12	B.Tech-Information Technology	1012194110	Cryptography & Network Security Lab	CO1	Evaluate different encryption algorithms on number theory
	VR19	12	B.Tech-Information Technology			CO2	Implement Symmetric cryptographic algorithms
	VR19	12	B.Tech-Information Technology			CO3	Implement Asymmetric cryptographic algorithms
	VR19	12	B.Tech-Information Technology			CO4	Execute Various Cryptographic Hash algorithms
60	VR19	12	B.Tech-Information Technology	1001194160	Disaster Management (Open Elective-IV)	CO1	Know the basic concepts in Disasters and its triggering factures
	VR19	12	B.Tech-Information Technology			CO2	Understand stages of hydrological disaster
	VR19	12	B.Tech-Information Technology			CO3	Analyse the causes, effects, impacts and of hydrological, geological and coastal hazards.
	VR19	12	B.Tech-Information Technology			CO4	Understand the mitigation procedure of uncertain events
61	VR19	12	B.Tech-Information Technology		Cloud Computing (Professional Elective-V)	CO1	apply the knowledge of cloud technology to infer the working principles of cloud computing
	VR19	12	B.Tech-Information Technology			CO2	analyse cloud services extended by various cloud providers to build a cloud
	VR19	12	B.Tech-Information Technology			CO3	Identify emerging cloud programming paradigms and its software environments
	VR19	12	B.Tech-Information Technology			CO4	Design and develop the backup strategies for cloud data by pridcting the future risks

62	VR19	12	B.Tech-Information Technology		Natural Language Processing (Professional Elective-V)	CO1	elucidate the parametric and linear models of classification in domain specific applications
	VR19	12	B.Tech-Information Technology			CO2	Compare and parameterize different learning algorithms in NLP applications
	VR19	12	B.Tech-Information Technology			CO3	Develop machine independent and unsupervised learning techniques.
	VR19	12	B.Tech-Information Technology			CO4	Apply pattern recognition techniques to real world problems such as documentation analysis and recognition
63	VR19	12	B.Tech-Information Technology	1012194250	Ad-hoc Sensor Networks (Professional Elective-V)	CO1	minimise and deploy the challenges in designing MAC, routing and transport protocols for wireless ad-hoc/sensor networks
	VR19	12	B.Tech-Information Technology			CO2	Comprehend the various sensor network Platforms, tools and applications.
	VR19	12	B.Tech-Information Technology			CO3	resolve the unique issues in ad-hoc/sensor networks
	VR19	12	B.Tech-Information Technology			CO4	Implement designing routing and transport protocols for wireless Ad-hoc/sensor networks.
64	VR19	12	B.Tech-Information Technology		Distributed Systems (Professional Elective-V)	CO1	Illustrate the basic elements and concepts related to distributed system technologies
	VR19	12	B.Tech-Information Technology			CO2	List the characteristics of distributed systems for designing architectural models
	VR19	12	B.Tech-Information Technology			CO3	Enumerate the features and applications of important standard protocols which are used in the
	VR19	12	B.Tech-Information Technology			CO4	Interpret inter-process communication in a distributed system

PRINCIPAL
VIGNAN'S INSTITUTE OF
Information Technology (A)
Beside: VSEZ, Duvvada, Visakhapatnam-49

VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY (A)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
COURSE OUTCOMES

S.No	Regulation	Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
1	VR19	02	B.Tech-Electrical and Electronics Engineering	1000191100	Mathematics-I	CO1	Execute mean value theorems and evaluate maxima and minima of functions of two variables without constraints.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply the analytical methods to solve higher order linear differential equations.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Evaluate and solve initial and boundary value problems arising in engineering stream.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Identify and solve ordinary differential equations using Laplace transforms
2	VR19	02	B.Tech-Electrical and Electronics Engineering	1000191122	SOLID STATE PHYSICS	CO1	Understand basic knowledge of crystal structures to characterize the materials using X-ray diffraction techniques.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Interpret the magnetic and electrical properties of materials.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyzethe important properties of superconductors and their utilization in different engineering applications.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze energy bands in crystalline solids to understand semiconductor physics.
3	VR19	02	B.Tech-Electrical and Electronics Engineering	1000191101	MATHEMATICS – II	CO1	Solve approximate roots of an equation by using different numerical methods.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Compute interpolating polynomial for a given data
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	To understand different numerical methods to solve integrations and ordinary differentialequations.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Solve the system of Linear equations using rank of a matrix and also Eigen values and Eigen vectors of a square matrix
4	VR19	02	B.Tech-Electrical and Electronics Engineering	1003191100	ENGINEERING MECHANICS	CO1	Analyze the force systems for equilibrium conditions and able to draw free body diagram.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Evaluate the frictional forces between contact surfaces.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Able to differentiate between centroid and centre of gravity and determine Centroid, centre of gravity and second moment of area for composite sections.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyse the motion and calculate trajectory characteristics.

5	VR19	02	B.Tech-Electrical and Electronics Engineering	1005191120	PROBLEM SOLVING AND PROGRAMMING USING C	CO1	Interpret fundamentals of computers and convert flowcharts/algorithms to C Programs, compile and debug programs
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply decision making and Iterative feature of C Programming language effectively.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Design and implement programs to analyze the different pointer applications
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Apply structures and unions and Implement file Operations in C programming for any given problem
6	VR19	02	B.Tech-Electrical and Electronics Engineering	1000191130	CONSTITUTION OF INDIA	CO1	Have general knowledge and legal literacy and thereby to take up competitiveexaminations
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Understand state and central policies, fundamental duties.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Understand Electoral Process, special provisions.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Assess the powers and functions of Municipalities, Panchayats and Cooperative
7	VR19	02	B.Tech-Electrical and Electronics Engineering	1000191131	Extra-Curricular Activity (Audit Course)	CO1	Learn new skills
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Boost academic performance
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Broader social skills
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Improve time management
8	VR19	02	B.Tech-Electrical and Electronics Engineering	1000191200	Transforms and Vector Calculus	CO1	Formulate any period function in terms of sine and cosine
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Simplify a non periodic function as integral representation
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Apply multiple integration techniques in evaluating areas and volume bounded by region.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Apply Green's, Gauss and Stokes theorem as the generalisation of fundamental theorem of integral calculus.
9	VR19	02	B.Tech-Electrical and Electronics Engineering	1000191123	APPLIED CHEMIST	CO1	Identification of different polymers and their functionalities
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Determination of structure to many compounds and apply the basic knowledge in construction of cell and its applications

	VR19	02	B.Tech-Electrical and Electronics Engineering	1000191123	CHEMISTRY	CO3	Analysis of corrosive environments and protection of precious metal
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Adoption of different green methodologies and acquire knowledge on different advanced materials
10	VR19	02	B.Tech-Electrical and Electronics Engineering		Applied Chemistry - Laboratory	CO1	Determine hardness and alkalinity of water.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Determine the concentration of acids.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Compute the iron (II) by using solutions
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Construct a galvanic cell
11	VR19	02	B.Tech-Electrical and Electronics Engineering	1002191221	ELECTRICAL CIRCUIT ANALYSIS-I	CO1	Solve various Electrical networks in the presence of active and passive ELEMENTS
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyse Electrical networks with various Network theorems for Dcexcitation
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Illustrate R, L, C networks and solve various networks with ACCO3 excitation along with theorems and Resonance concept
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Compare Electric and Magnetic Circuits and solve Magnetic circuits ALONG WITH DOT CONVENTION
12	VR19	02	B.Tech-Electrical and Electronics Engineering	1003191101	ENGINEERING DRAWING	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Learn the principle of orthographic projections. Draw Orthographic projections of points, lines.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Draw the various types of planes and solids its views in different Positions
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Draw isometric views of simple objects
13	VR19	02	B.Tech-Electrical and Electronics Engineering	1000191121	TECHNICAL ENGLISH COMMUNICATION	CO1	Read, understand and interpret material on Environment, Science and CO1 Technology, tourism, Energy Sources, Social Awareness
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	CO2 Analyze the functions of language and grammar in spoken and written forms.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Write effectively on various domains..

	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Prepare and exhibit oral presentation skills by
14	VR19	02	B.Tech-Electrical and Electronics Engineering	1003191210	ENGINEERING WORKSHOP	CO1	Understand different operations: Fitting, smithy, carpentry and Electrical wiring.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Perform the fitting and carpentry operations.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Develop simple objects like funnel, elbow etc. using sheet metal.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Apply basic electrical engineering knowledge for house wiring practice like stair case wiring, series and parallel connections
15	VR19	02	B.Tech-Electrical and Electronics Engineering	1000191110	Engineering Exploration	CO1	CO1 Realize the purpose/Role of Engineer for solving social problems.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Design engineering way. a component/system in an
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Implement mechanisms, Arduino, sensors, motors
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Design prototype machine using Arduino Uno board.
16	VR19	02	B.Tech-Electrical and Electronics Engineering	1002192100	Fundamentals of signals and systems	CO1	Distinguish between various types of signals and systems.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Understand the conversion of continuous time signals to discrete time signals and vice versa.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Interpret continuous time LTI systems
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze discrete time LTI systems
17	VR19	02	B.Tech-Electrical and Electronics Engineering	1002192120	ELECTRICAL MACHINES-I	CO1	Understand the working principle and construction of DC machine and Transformers
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Examine the characteristics and Testing methods of DC Machines and Transformers
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Illustrate speed control methods of DC Motors and study the losses in DC Machines and Transformers
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Develop Phasor diagrams for Transformer with different load conditions

18	VR19	02	B.Tech-Electrical and Electronics Engineering	1002192101	ELECTRO MAGNETIC FIELDS	CO1	Calculate electric field from various charge distributions and find magnetic field from various current distributions.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Understand polarization in dielectrics, electric current density, and resistance of conductors and also Calculate force in electric and magnetic fields and torque in magnetic fields.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Determine inductance, capacitance of different physical configurations.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Apply Faraday's Law to calculate induced Emf and understand the effect of Electromagnetic radiation.
19	VR19	02	B.Tech-Electrical and Electronics Engineering	1004192122	BASIC ELECTRONIC AND CIRCUITS	CO1	Distinguish the characteristics of different diodes and choose appropriate diode for an application based on the operation
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Explain the operation and design aspects of rectifiers, and filter.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Design different biasing and stabilization circuits and explain compensation techniques for a transistor.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze positive and negative feedback and the role of feedback in oscillators and amplifiers.
20	VR19	02	B.Tech-Electrical and Electronics Engineering	1000192110	COMMUNICATION SKILLS LAB	CO1	Analyze the functions of language and grammar in spoken and written forms with an emphasis on LSRW Skills.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Disseminate the relevant skills while performing GDs, interviews, oral presentations with a focus on Non verbal communication.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	CO3 Prepare and exhibit oral presentation skills by using ICT.(Individual/Team)
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Organize proper life skills for their employability.
21	VR19	02	B.Tech-Electrical and Electronics Engineering	1002192102	ELECTRICAL CIRCUIT ANALYSIS-II	CO1	Understand the measurement of three-phase power under balanced and unbalanced load condition.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyze transient response of the electrical networks with DC and AC excitation.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Determine the two port network parameters for different types of electrical networks.

	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Realize the electrical equivalent network for a given network transfer functions
22	VR19	02	B.Tech-Electrical and Electronics Engineering	1002192220	Electrical Machines-II	CO1	Understand the construction and operation of induction motors and synchronous machines
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Interpret the torque producing mechanism and testing methods of induction motors and regulation of synchronous machines
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze various starting methods, phasor diagrams and equivalent circuit of induction motors and synchronous machines
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Evaluate the performance of induction motors and synchronous machines in real time applications
23	VR19	02	B.Tech-Electrical and Electronics Engineering	1004192203	ANALOG ELECTRONICS	CO1	Understand the concept of wave shaping circuits, switching characteristics of diode and transistor, PLL and Timer, the Logic gates and minimization of logic functions.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply the knowledge of operational amplifiers with linear integrated circuits
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze the active filters using op-amp and Boolean Alzebra expression
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Design circuits using operational amplifiers for various applications.
24	VR19	02	B.Tech-Electrical and Electronics Engineering	1002192201	POWER GENERATION ENGINEERING AND ECONOMICS	CO1	Understand the layout of Thermal,Wind, Hydro, Nuclear, Solar, Gas,Geothermal and OTEC power stations.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Examine the operation of power plants and Fuel cells.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Compare and contrast the energy scenario and tariffs in India and the World.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Design a PV system for given load specifications.
25	VR19	02	B.Tech-Electrical and Electronics Engineering	1002192221	CONTROL SYSTEMS	CO1	Derive the transfer function and state space models for electrical,mechanical and electro-mech systems
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyze the Transient & Steady State Performance of a different system.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Determine the stability of different Linear Time invariant systems.

	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Design lag,lead and lag-lead compensators for different systems to improve system performance.
26	VR19	02	B.Tech-Electrical and Electronics Engineering	1099192200	MANAGEMENT SCIENCE	CO1	Illustrate basic insights of management principles
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Summarize Production process, Quality control and Inventory techniques
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Apply Strategies and policies to functional areas
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	AnalyzeContemporary management Practices
27	VR19	02	B.Tech-Electrical and Electronics Engineering	1000192130	ENVIRONMENTAL Science (Audit Course)	CO1	Gain a higher level of personal involvement and interest in understanding and solving environmental resource problems and its sustainable conservation practices.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Overall understanding of the relationship between man and ecosystem & biodiversity
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Recognize the interconnectedness of human dependence on the earth's ecosystems and Influence their society in proper utilization of goods and services.
28	VR19	02	B.Tech-Electrical and Electronics Engineering	1020192100	Employability Readiness Program-I (Open Elective-1)	CO1	Acquire adequate writing skills that are needed in an organization
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Understand the core competencies to succeed in professional and personal life
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Solve various Basic Mathematics problems by following different methods and to perform well in various competitive exams and placement drives.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Implement strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO1	Students will be able to understand definition, scope, approach and theories of public administration.

29	VR19	02	B.Tech-Electrical and Electronics Engineering	1020192101	PUBLIC ADMINISTRATION	CO2	Students will be able to identify the process and technique of decision making and also understand the concept of administrative behaviour and control.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Students will be able tounderstand the process and technique of personnel and financial administration.
						CO5	Students will be able to understand and explain the major administrative techniques and values that public administration has and illustrate how those affect the work of government and also understand the process of administrative improvement.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Students will be able to Discuss the tools that modern public administrators use to pursue public goals and public policy, along with the pros and cons of those tools.
30	VR19	02	B.Tech-Electrical and Electronics Engineering	1020192102	Foreign Linguistic - FRENCH	CO1	Students have the adequate reading and speaking skills and will be able to express himself in French.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Understand the grammar and use them in their personal and professional life.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Students will be able to write proficiently in French.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Studentswill be able to compare and contrast world culture and it will expand his knowledge about various culture.
31	VR19	02	B.Tech-Electrical and Electronics Engineering	1002192170	Mini Project – I EPICS/Societal relevant project	CO1	Create an Industrial environment and culture within the institution.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Provide students hands on experience on, troubleshooting, maintenance, fabrication, innovation, record keeping, documentation etc thereby enhancing the skill and competency part of technical education.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Inculcate innovative thinking and thereby preparing students for main project.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Set up self-maintenance cell within departments to ensure optimal usage of infrastructure facilities.

32	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193100	Power transmission engineering	CO1	Compute inductance/capacitance of transmission lines and to understand the concepts of GMD/GMR.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyze the performance of short, medium and long transmission lines.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Summarize various factors related to charged transmission lines and underground cables.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Estimate sag/tension of transmission lines, performance of line insulators.
33	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193120	ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	CO1	Describe the working principle and constructional features of different types of analog and digital measuring instrument for measurement of voltage, current, resistance, power, power factor, energy and magnetic measurements and various physical Quantities.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Calibrate energy meter by suitable methods.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Select suitable bridge for measurement of electrical parameters.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Measure voltage, current, resistance by using potentiometer and frequency and phase difference between signals using CRO.
34	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193121	POWER ELECTRONICS	CO1	Understand the static and dynamic characteristics of various power semiconductor devices
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Interpret the operation of single phase and three phase rectifiers.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyzethe operation of different types of DC-DC converters.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Evaluate the performace of different types of AC-AC converters
35	VR19	02	B.Tech-Electrical and Electronics Engineering	1004193102	DIGITAL ELECTRONICS	CO1	Understand the Number Systems and their conversions and Describe about Logic Gates and logic families.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply minimization techniques (boolean algebra and K-maps) to minimize logic expressions.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze Combinational Logic Circuits and Sequential logic circuits .
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Design Combinational Logic Circuits and Sequential logic circuits .

36	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193150	DIGITAL CONTROL SYSTEMS	CO1	Understand the modelling of digital control Systems in frequency domain and time domain.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Realize the z–transformations and their role in the mathematical analysis of different systems
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyse stability of the Linear Discrete systems
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Design the state feedback controller for Linear Discrete systems
37	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193151	ENERGY AUDIT CONSERVATION AND MANAGEMENT	CO1	Understand principles of energy auditing, Energy management programme, purpose of energy conservation schemes and the operation of various energy instruments
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Identify different space heating and ventilation methods
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Solve and conclude the economic aspects of energy consumption
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze power factor improvement methods and Distinguish the operating principle constructional features of energy efficient motors
	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193152	SPECIAL ELECTRICAL MACHINES	CO1	Understand the performance and principle of operation of stepper motor ,Switch d reluctance motor,PMDC,PM Materials and BLDC motors
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Implement different control and switching circuits for stepper motor,SRM,BLDC motors
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyse the theory of travelling magnetic field and identify the applications of linear motors in electric traction
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Design the constructional features of Switched reluctance motor
39	VR19	02	B.Tech-Electrical and Electronics Engineering	1012193161	FUNDAMENTALS OF PYTHON PROGRAMMING	CO1	Understand operators, conditionals, functions,data structures and OOPs concepts of python.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Install Python IDE and run python scripts.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Import packages and handle Exceptions, files in Python.

	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Develop programs using Numpy, Pandas,Matplotlib Libraries in Python.
40	VR19	02	B.Tech-Electrical and Electronics Engineering	1003193162	MECHATRONICS	CO1	Identification of different sensors, transducers, signal conditioning techniques
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Understanding and designing mechatronic motion logic control system and the key elements in its design
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Develop a PLC programming techniques with Microprocessor, ladder diagram for different logic Gates
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Design and Implementation of Micro Mechatronics System
41	VR19	02	B.Tech-Electrical and Electronics Engineering	1004193160	SIGNAL PROCESSING	CO1	Design, simulate and realize different digital filters.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Estimate the spectra of signals that are to be processed by discrete time system and to verify the performance of various spectrum estimation techniques
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Design multi rate digital signal processing system.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze architecture of DSP processor
42	VR19	02	B.Tech-Electrical and Electronics Engineering	1099193131	IPR & PATENTS	CO1	Interpret the various aspects of IPR
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Conclude importance of Copyrights, Tradema
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Obtain Patent Rights for New Innovations
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Elaborate on Privacy Issues
43	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193180	TECHNICAL SEMINAR	CO1	Relate literature to formulate problem statements of technology and innovations in EEE
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Develop documentation, presentation and communication skills for profession and personal growth following ethical values
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Identify new directions in Multidisciplinary area
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Assess engineering solution and its applications for Real time problem
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO1	Understand the principles of Power electronics control of electric drives.

44	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193200	Power Electronics Controllers and Drives	CO2	Recognise the speed control of DC machines using DC DC converters
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Categorize the stator side and rotor side control of three phase AC drives.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Describe VSI, PWM techniques to control the synchronous motor.
45	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193201	POWER SYSTEM ANALYSIS	CO1	Understand the per unit values of system and formulate Ybus&Zbus for a given power system network
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply various numerical methods to power system for determining power flows
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Compute symmetrical and asymmetrical fault calculations for a given power system network
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze the steady state and transient stabilities of power system.
46	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193202	UTILIZATION OF ELECTRICAL ENERGY	CO1	Identify a suitable motor for electric drives and industrial applications
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Describe various electrical heating, welding methods.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Explain the basic terminology in illumination and compare the type of lamps
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze the speed –time characteristics of different services of traction and calculate tractive effort, power and specific energy.
47	VR19	02	B.Tech-Electrical and Electronics Engineering	1004193222	MICROPROCESSORS AND MICROCONTROLLERS	CO1	Understand the concepts of microcomputer system andexplore the architecture of microprocessors and microcontroller.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Explore hardware configuration of 8086 and able to write assembly language program for basic arithmetic applications.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Apply the knowledge of Interfacing memory and I/O devices with 8086
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Developinterfacing circuit of different sensors and actuators with 8051. And apply the knowledge of programming for industrial applications.
48	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193250	Energy Storage Systems	CO1	Discuss about electrical energy storage systems
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Examine about various electrochemical batteries
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze the operation of Li-ion battery

	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Assess the Electric Vehicles Charging Station
49	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193251	Photovoltaic and wind energy system	CO1	To analyze the characteristics of solar radiation, PV cells, modules and arrays
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Design of grid-connected PV schemes, Control of real and reactive power
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	To analyze fixed speed and variable speed Wind Energy Conversion Systems.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	To analyze integration issues in PV-wind Systems.
50	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193252	Neural Networks and Fuzzy Logic	CO1	Understand different architectures of ANN models of artificial neuron, learning strategies and algorithms
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Classify between classical and fuzzy sets.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Use different modules of Fuzzy logic controller
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Apply Neural Networks and fuzzy logic for electrical engineering
51	VR19	02	B.Tech-Electrical and Electronics Engineering	1020193100	Employability Readiness Program -II	CO1	Students have the adequate writing skills that are needed in an organization and To perform well during Campus Drives and different Interviews
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Understand the core competencies to succeed in professional and personal life and Students will develop knowledge and experience with the use of the standard C programming language,
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Solve various Basic Mathematics problems by following different methods and analyses, summarize and present information in quantitative forms including table, graphs and formulas
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.

52	VR19	02	B.Tech-Electrical and Electronics Engineering	1019193252	INTRODUCTION TO EMBEDDEDSYSTEM	CO1	Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Design the Embedded hardware by considering the hardware components required for an embedded system
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze the various embedded firmware design approaches on embedded environment to suit for desired application
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	integrate hardware and firmware of an embedded system and apply this knowledge to real time operating system.
53	VR19	02	B.Tech-Electrical and Electronics Engineering	1012193260	Data Mining	CO1	Understand data pre-processing and data visualization techniques
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Study algorithms for finding hidden and interesting patterns in data
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	study and analyzevarious classification techniques.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Apply various clustering techniques using tools in various algorithms
	VR19	02	B.Tech-Electrical and Electronics Engineering	1005193260	Introduction to Database Management Systems	CO1	Understand ER model and Relational models
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Execute SQL queries for various conditions
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze different indexing techniques, evaluate time complexity and its storage
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Create database and transactions
55	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193260	ELECTRIC VEHICLES	CO1	Distinguish the IC, EV's
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyse the Storage systems and Energy management system for EV's
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Design Electric Drive System
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Assess the performance of HEV's

56	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193261	Fundamentals of Electrical Machines	CO1	Understand the construction of the both DC and AC machines
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Distinguish the operation of DC and AC machines
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Calculate the performance parameters of DC motors, transformer
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Calculate the performance parameters of induction motor, Synchronous generator
57	VR19	02	B.Tech-Electrical and Electronics Engineering	1099192100	Managerial Economics and Financial Analysis	CO1	Evaluate the production theories and pricing policies of various enterprises
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Design and implement different structures of market covering how price is determined under different market structures. Also can able to take decisions using business cycles
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze different forms of business organizations existing in the modern business and able to choose suitable form of business.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Prepare financial statements and understand and implement the capital budgeting tools and techniques.
58	VR19	02	B.Tech-Electrical and Electronics Engineering	1002194100	SWITCHGEAR AND PROTECTION	CO1	Understand the different types of Circuit Breakers and Relay in Power system
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Design the rating of CB and Relay to protect the Power System against the Faults
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Differentiate the grounded and ungrounded power system against over voltage Protection
59	VR19	02	B.Tech-Electrical and Electronics Engineering	1002194120	PROGAMMABLE LOGIC CONTROLLERS & APPLICATIONS	CO1	Describe the PLC architecture and its I/O devices.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Construct the Ladder diagram using contacts & coils.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Apply various function blocks like timer, counter and program control & data handling instructions.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Develop ladder logic for various industrial automation.
60	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193260	ELECTRIC	CO1	Distingish the IC , EV's
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Analize the Storage systems and Energy management system for EV's

	VR19	02	B.Tech-Electrical and Electronics Engineering	1002195200	VEHICLES	CO3	Design Electric Drive System
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Design of HEV's
61	VR19	02	B.Tech-Electrical and Electronics Engineering	1002194150	HVDC TRANSMISSION	CO1	Compare HVDC and AC transmission system w.r.t. economical, technical and reliability aspects.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyze the six pulse and twelve pulse converter configurations and describe converter control characteristics and MTDC systems.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Describe various converter faults and protection methods in HVDC transmission system.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Explain generation of harmonics and design suitable filters to eliminate them.
62	VR19	02	B.Tech-Electrical and Electronics Engineering	1002194151	OPTIMIZATION TECHNIQUES	CO1	State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply classical optimization techniques to minimize or maximize a multi- variable objective function, without or with constraints, and arrive at an optimal solution.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Apply gradient and non-gradient methods to nonlinear optimization
63	VR19	02	B.Tech-Electrical and Electronics Engineering	1002194152	POWER QUALITY	CO1	Understand different types of power quality problems with their source of generation and suggest preventive techniques.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Evaluate the effects of harmonics on power system equipments and analyze the methods of controlling of harmonics.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze the sources , types and mitigation of over voltage issues and model of over voltage problem with computer software tools.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Examine the power quality issues and operating conflicts when DG is interconnected to the grid.

64	VR19	02	B.Tech-Electrical and Electronics Engineering	1002194153	Microgrid and Smart grid	CO1	Explain topologies, interconnection issues of DGs and features of grid connected DG systems
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Design power converter topologies for DG applications and implement the control of Microgrid
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Interpret the concept of Resilient and Self-Healing Grid.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	AnalyzeMicro Grids (MGs) and Distributed Energy Resources (DERs) and alsoPQ issues with RES and also ICT for Smart Grid.
65	VR19	02	B.Tech-Electrical and Electronics Engineering	1002194154	Advanced Control Systems	CO1	Model the different systems(electrical, mechanical and electro mechanical systems) in terms of various state models.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Design the state feedback controller and observer for different systems.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Interpret different nonlinearities and stability of the system
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Formulate and solve the different optimal control problems
66	VR19	02	B.Tech-Electrical and Electronics Engineering	1019193260	Internet of Things	CO1	To Understand the Architecture, protocols and applications of IoT.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	To Analyse the communication protocols and standards used in IoT
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	To analyse and design the simple IoT applications to monitor or control IoT devices using simulation or hardware
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	To implement the real time IoT applications.
67	VR19	02	B.Tech-Electrical and Electronics Engineering	1005194160	Introduction to Machine Learning	CO1	Recognize the characteristics of machine learning that make it useful to real-world Problems
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervised
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Be able to use support vector machine, regularized regression algorithms
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze the concept behind neural networks for learning non-linear functions
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO1	Identify various robot configuration and components

68	VR19	02	B.Tech-Electrical and Electronics Engineering	1003193160	INDUSTRIAL ROBOTICS	CO2	Select appropriate actuators and sensors for a robot based on specific application
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Carry out kinematic and dynamic analysis for simple serial kinematic chains
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Perform trajectory planning for manipulator by avoiding obstacles.
69	VR19	02	B.Tech-Electrical and Electronics Engineering	1002194160	PROGRAMMABLE LOGIC CONTROLLERS	CO1	Describe the PLC architecture and its I/O devices.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Construct the Ladder diagram using contacts & coils.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Apply various function blocks like timer, counter and program control & data handling instructions.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Develop ladder logic for various industrial automation.
70	VR19	02	B.Tech-Electrical and Electronics Engineering	1002193151	ENERGY AUDIT CONSERVATION AND MANAGEMENT	CO1	Understand principles of energy auditing, Energy management programme, purpose of energy conservation schemes and the operation of various energy instruments
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Identify different space heating and ventilation methods
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Solve and conclude the economic aspects of energy consumption
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze power factor improvement methods and Distinguish the operating principle constructional features of energy efficient motors
71	VR19	02	B.Tech-Electrical and Electronics Engineering	1002194250	Electrical distribution system	CO1	Understand the Design of substations and distribution systems and Identifying the different factors of distribution systems CO2 Calculate voltage drops and power loss manually at each and every point in a line
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Calculate voltage drops and power loss manually at each and every point in a line
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Illustrate the distribution system protection anc
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyse the effect of compensation on power factor improvement and voltage control on distribution system.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO1	Outline various components of power system control.

72	VR19	02	B.Tech-Electrical and Electronics Engineering	1002194251	POWER SYSTEM OPERATION &CONTROL	CO2	Apply algorithms to solve optimal scheduling of Hydrothermal Systems.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyse single area and two area load frequency control.
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Distinguish performance of reactive power compensation in transmission systems.
73	VR19	02	B.Tech-Electrical and Electronics Engineering	1002194252	FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEM	CO1	Compare voltage sourced converter (VSC) and current sourced converter (CSC)
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply the shunt and Series compensators for improving the transient stability , steady state stability and power oscillation damping's
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyse control of SVC, STATCOM to compensate the transmission Parameters
	VR19	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyse the combined compensators used in enhancing the transmission line Performance

PRINCIPAL
VIGNAN'S INSTITUTE OF
Information Technology (A)
Beside: VSEZ, Duvvada, Visakhapatnam-49

VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY (A)

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES

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

5	VR19	01	B.Tech-Civil Engineering	1005191120	PROBLEM SOLVING AND PROGRAMMING USING C	CO1	Interpret fundamentals of computers and convert flowcharts/algorithms to C Programs
	VR19	01	B.Tech-Civil Engineering			CO2	Apply decision making and iterative feature of C programming language effectively
	VR19	01	B.Tech-Civil Engineering			CO3	Develop programs using modular techniques
	VR19	01	B.Tech-Civil Engineering			CO4	Make use of user defined datatypes and implement them for various applications
6	VR19	01	B.Tech-Civil Engineering	1000191130	CONSTITUTION OF INDIA	CO1	Have general knowledge and legal literacy and thereby to take up competitive examinations.
	VR19	01	B.Tech-Civil Engineering			CO2	Distinguish the power of state and central government
	VR19	01	B.Tech-Civil Engineering			CO3	Summarize the election procedure in India before and after independence
	VR19	01	B.Tech-Civil Engineering			CO4	Association with the powers and functions of Municipalities, Panchayats and Cooperative Societies.
7	VR19	01	B.Tech-Civil Engineering	1000191101	Mathematics-II	CO1	Solve approximate roots of an equation by using different numerical methods.
	VR19	01	B.Tech-Civil Engineering			CO2	Compute Interpolating polynomial for the given data.
	VR19	01	B.Tech-Civil Engineering			CO3	Compute Numerical Solution of ODE and Numerical Integration.
	VR19	01	B.Tech-Civil Engineering			CO4	Evaluate simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix.
8	VR19	01	B.Tech-Civil Engineering	1000191200	TRANSFORMS AND VECTOR CALCULUS	CO1	Formulate any period function in terms of sine and cosine
	VR19	01	B.Tech-Civil Engineering			CO2	Simplify a non-periodic function as integral representation
	VR19	01	B.Tech-Civil Engineering			CO3	Apply multiple integration techniques in evaluating areas and volume bounded by region.
	VR19	01	B.Tech-Civil Engineering			CO4	Explain Gradient, divergence and curl operations in vector and scalar fields and apply Green's, Gauss and Stokes theorem as the generalisation of fundamental theorem of integral calculus.
	VR19	01	B.Tech-Civil Engineering		ENGINEER	CO1	Measure water quality parameters, corrosive environment and protection of precious metal

9	VR19	01	B.Tech-Civil Engineering	1000191220	ING CHEMISTRY	CO2	Acquire the knowledge on advanced materials
	VR19	01	B.Tech-Civil Engineering			CO3	Analyze the different forms of energy sources
	VR19	01	B.Tech-Civil Engineering			CO4	Identify different polymers and their functionalities
10	VR19	01	B.Tech-Civil Engineering	1002191200	FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING	CO1	Apply Ohms Law and Kirchhoff's Laws and solve electrical circuits
	VR19	01	B.Tech-Civil Engineering			CO2	Describe the constructional features of DC machines, select suitable starters for DC motors estimate losses and efficiency of DC motor.
	VR19	01	B.Tech-Civil Engineering			CO3	Outline the constructional details and operating principles of AC machines and calculate the efficiency identify the characteristics, losses and efficiency of a three-phase induction motor.
	VR19	01	B.Tech-Civil Engineering			CO4	Identify the structure, operation and characteristics and applications of measuringinstruments and semi-conductordevices
11	VR19	01	B.Tech-Civil Engineering	1003191101	ENGINEERING DRAWING	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR19	01	B.Tech-Civil Engineering			CO2	Learn the principle of orthographic projections. Draw Orthographic projections of points, lines.
	VR19	01	B.Tech-Civil Engineering			CO3	Draw the various types of planes and solids its views in different Positions
	VR19	01	B.Tech-Civil Engineering			CO4	Draw isometric views of simple objects
12	VR19	01	B.Tech-Civil Engineering	1001191210	CIVIL ENGINEERING WORKSHOP	CO1	Set out of building in the field
	VR19	01	B.Tech-Civil Engineering			CO2	Construct a wall of thickness 1½ bricks using English bond
	VR19	01	B.Tech-Civil Engineering			CO3	Install plumbing the fixtures like Tap, T-Joint, Elbow, Bend, Threading
	VR19	01	B.Tech-Civil Engineering			CO4	Apply wall putty, painting of wall base coat and laying of tile flooring
13	VR19	01	B.Tech-Civil Engineering	1000191110	ENGINEERING EXPLORATION	CO1	Realize the purpose/Role of Engineer for solving social problems
	VR19	01	B.Tech-Civil Engineering			CO2	Learn to Design a component/system in an engineering way
	VR19	01	B.Tech-Civil Engineering			CO3	Learn to use mechanisms, Arduino, sensors,motors.
	VR19	01	B.Tech-Civil Engineering			CO4	Integrating different systems (mechanical/Electrical/computer) to work as a unit
	VR19	01	B.Tech-Civil Engineering			CO1	Learn new skills and boost academic performance

14	VR19	01	B.Tech-Civil Engineering	1000191131	Extra-Curricular Activities, Sports And Games (Audit Course)	CO2	Broader social skills with improved time management
	VR19	01	B.Tech-Civil Engineering			CO3	Explore Interest and Create Broader perspectives
	VR19	01	B.Tech-Civil Engineering			CO4	Participate in various co- curricular activities leading to their multifaceted personality development
15	VR19	01	B.Tech-Civil Engineering	1000192100	Complex Variables and Statistical Methods	CO1	Analyse the complex integration by using Cauchy's integral formula and find Taylor's, Maclaurin's series and Laurent series expansion of complex function.
	VR19	01	B.Tech-Civil Engineering			CO2	Evaluate contour integrals by using Residue theorem and explain the notation of random variables and evaluate the expected value and probability of random variables
	VR19	01	B.Tech-Civil Engineering			CO3	Evaluate the confidence levels and maximum errors for large and small samplings and apply the concept of hypothesis testing for large and small samples in real life situations.
	VR19	01	B.Tech-Civil Engineering			CO4	Examine correlation for bi-variate data and predict the regression analysis
16	VR19	01	B.Tech-Civil Engineering	1001192120	SURVEYING (CIVIL ENGINEERING)	CO1	Interpret various instruments to evaluate the required fields of surveying
	VR19	01	B.Tech-Civil Engineering			CO2	Describe levelling survey to find elevations followed by contour mapping
	VR19	01	B.Tech-Civil Engineering			CO3	Estimate the distances, areas and volumes, elevations using various advanced methodologies solving most practical problems
	VR19	01	B.Tech-Civil Engineering			CO4	Organize simple and compound curves along with examining the various measurements in accessing the aerial surveying with GPS devices
17	VR19	01	B.Tech-Civil Engineering	1001192100	BUILDING MATERIALS AND CONSTRUCTION	CO1	Predict the properties of building stones, bricks, tiles and its classifications.
	VR19	01	B.Tech-Civil Engineering			CO2	Describe the types of masonry and the properties, types, defects and alternatives of wood
	VR19	01	B.Tech-Civil Engineering			CO3	Identify building components include lintels, staircases, floors, roofs and trusses
	VR19	01	B.Tech-Civil Engineering			CO4	Distinguish the finishings include proofing, plastering, pointing, washing, paints and describe formwork and scaffolding

18	VR19	01	B.Tech-Civil Engineering	1001192121	STRENGTH OF MATERIALS	CO1	Understand the basics of material properties, stress and strain and evaluate the stress of thin cylinders.
	VR19	01	B.Tech-Civil Engineering			CO2	Compute the shear force bending moment of beams and
	VR19	01	B.Tech-Civil Engineering			CO3	Determine the flexural stresses, shear stresses and deflection in beams and springs
	VR19	01	B.Tech-Civil Engineering			CO4	Analyze columns and strutssubjected to axial loading under various end conditions anddetermine the deflections androtations produced by Torsionalloading of shafts
19	VR19	01	B.Tech-Civil Engineering	1001192122	FLUID MECHANICS	CO1	Describe the physical properties of fluids & their influences on fluid motion and Compute hydro static forces on various sub merged Surfaces.
	VR19	01	B.Tech-Civil Engineering			CO2	Compare the concepts of kinematics and dynamics of fluid flow.
	VR19	01	B.Tech-Civil Engineering			CO3	Analyze the boundary layer of fluid in laminar and turbulent flows.
	VR19	01	B.Tech-Civil Engineering			CO4	Calibrate flow in pitot tube, venturi meter, orifice meter, orifices, notches and weirs
20	VR19	01	B.Tech-Civil Engineering	1001192101	BUILDING PLANNING AND DRAWING	CO1	Utilize the building byelaws and regulations for construction
	VR19	01	B.Tech-Civil Engineering			CO2	Describe the orientation, standards, requirements, types and planning of various residential and public buildings
	VR19	01	B.Tech-Civil Engineering			CO3	Draw the sign conventions of various types of building materials and bonds
	VR19	01	B.Tech-Civil Engineering			CO4	Produce plans and sectional elevations of various residential and public buildings
21	VR19	01	B.Tech-Civil Engineering	1001192200	STRUCTURAL ANALYSIS-I	CO1	Distinguish between stable and unstable and statically determinate and indeterminate structures
	VR19	01	B.Tech-Civil Engineering			CO2	Analyze the S.F, B.M and deflection of propped, fixed and continuous beams
	VR19	01	B.Tech-Civil Engineering			CO3	Calculate the deflections of beams by using strain energy method and apply the moment distribution method and slope deflection method to analyze statically indeterminate structures
	VR19	01	B.Tech-Civil Engineering			CO4	Evaluate and draw the influence lines for reactions, shears, and bending moments in beams and girders due to moving loads.

22	VR19	01	B.Tech-Civil Engineering	1001192220	TRANSPORTATION ENGINEERING	CO1	Finalize suitable highway alignment and Design of geometric elements for different terrains.
	VR19	01	B.Tech-Civil Engineering			CO2	Describe traffic engineering studies include traffic studies like volume parking, signaling, accident etc.
	VR19	01	B.Tech-Civil Engineering			CO3	Distinguish the highway materials and its suitability for different types pavement
	VR19	01	B.Tech-Civil Engineering			CO4	Assess the required Ideal Railway Alignment and suitable site for airport construction
23	VR19	01	B.Tech-Civil Engineering	1001192221	HYDRAULICS AND HYDRAULIC MACHINERY	CO1	Analyzing the behaviour of uniform and non-uniform flow in a open channel.
	VR19	01	B.Tech-Civil Engineering			CO2	Creating a model for a prototype by using the concept of simulation techniques.
	VR19	01	B.Tech-Civil Engineering			CO3	Applying the concept of generating hydroelectricity using hydraulic turbines.
	VR19	01	B.Tech-Civil Engineering			CO4	Estimate the head and discharge through Centrifugal-Pumps and Reciprocating-Pumps in detail
24	VR19	01	B.Tech-Civil Engineering	1001192222	Environmental Engineering	CO1	Analyze problems associated with water supply engineering
	VR19	01	B.Tech-Civil Engineering			CO2	Design water conveyance, treatment, storage and distribution systems
	VR19	01	B.Tech-Civil Engineering			CO3	Solve societal water supply engineering problems through proper investigations and interpretation
	VR19	01	B.Tech-Civil Engineering			CO4	Determine and maintain quality standards in water supply schemes.
25	VR19	01	B.Tech-Civil Engineering	1020192100-	Employability Readiness Program-I (Open Elective-1)	CO1	Interpret and participate in writing skills that are needed in an organisation
	VR19	01	B.Tech-Civil Engineering			CO2	Recognize the need of core competencies to succeed in professional and personal life
	VR19	01	B.Tech-Civil Engineering			CO3	Solve various basic mathematics problems by following different methods and to perform in various competitive exams and placement drives

	VR19	01	B.Tech-Civil Engineering			CO4	Apply shortcut methods to solve problems and confidently
26	VR19	01	B.Tech-Civil Engineering	1020192101	PUBLIC ADMINISTRATION	CO1	Interpret and manage in public governance
	VR19	01	B.Tech-Civil Engineering			CO2	Participate in and contribute to the policy process
	VR19	01	B.Tech-Civil Engineering			CO3	Analyse, think critically, solve problems and make decisions
	VR19	01	B.Tech-Civil Engineering			CO4	Articulate and apply a public service perspective
27	VR19	01	B.Tech-Civil Engineering	1020192102	FOREIGN LINGUISTIC - FRENCH	CO1	Construct simple sentences in French using Syntax and grammar
	VR19	01	B.Tech-Civil Engineering			CO2	Pronounce and read French reasonably well
	VR19	01	B.Tech-Civil Engineering			CO3	Demonstrate an elementary knowledge of French sentence through speaking and writing
	VR19	01	B.Tech-Civil Engineering			CO4	Apply basic spoken French and demonstrate understanding by writing and/or responding properly
28	VR19	01	B.Tech-Civil Engineering	1000192130	ENVIRONMENTAL SCIENCE (Audit Course)	CO1	Gain a higher level of personal involvement and interest in understanding and solving environmental resource problems and its sustainable conservation practices.
	VR19	01	B.Tech-Civil Engineering			CO2	Overall understanding of the relationship between man and ecosystem & biodiversity
	VR19	01	B.Tech-Civil Engineering			CO3	Demonstrate knowledge relating to the biological systems involved in the major global environmental problems of the 21st century
	VR19	01	B.Tech-Civil Engineering			CO4	Recognize the interconnectedness of human dependence on the earth's ecosystems and influence their society in proper utilization of goods and services.
29	VR19	01	B.Tech-Civil Engineering	1000192110	Communication Skills Lab	CO1	Analyse the functions of language and grammar in spoken and written forms with an emphasis on LSRW Skills.
	VR19	01	B.Tech-Civil Engineering			CO2	Disseminate the relevant skills while performing GDs, interviews, oral presentations with a focus on Non-verbal communication.
	VR19	01	B.Tech-Civil Engineering			CO3	Prepare and exhibit oral presentation skills by using ICT.(Individual/Team)
	VR19	01	B.Tech-Civil Engineering			CO4	Organize proper life skills for their employability.

30	VR19	01	B.Tech-Civil Engineering	1001192170	MINI PROJECT – I (EPICS/Societal Relevant Project)	CO1	Understand the various social problems present in the world &problem to develop a technological project
	VR19	01	B.Tech-Civil Engineering			CO2	Utilise the design thinking and project management with various technical software in addressing the project
	VR19	01	B.Tech-Civil Engineering			CO3	Apply the engineering knowledge, mathematics, design thinking and project management to develop a community project.
	VR19	01	B.Tech-Civil Engineering			CO4	Recogniseprofessional responsibilities and make informed judgements in civil practice
	VR19	01	B.Tech-Civil Engineering	1099192100	Managerial Economics and Financial Analysis	CO1	Analyse the Demand, Price and Cost.
	VR19	01	B.Tech-Civil Engineering			CO2	Identify the Nature of different markets
	VR19	01	B.Tech-Civil Engineering			CO3	Understand Various Business Forms
	VR19	01	B.Tech-Civil Engineering			CO4	Evaluate investment project proposals
32	VR19	01	B.Tech-Civil Engineering	1001193120	CONCRETE TECHNOLOGY	CO1	Identify the various types of materials and understand the quality control tests on construction materials
	VR19	01	B.Tech-Civil Engineering			CO2	Assimilate the behaviour of fresh concrete and special concretes
	VR19	01	B.Tech-Civil Engineering			CO3	Determine the durability properties of hardened concrete
	VR19	01	B.Tech-Civil Engineering			CO4	Design various grades of concrete mixes as per IS Code
33	VR19	01	B.Tech-Civil Engineering	1001193121	GEOTECHNICAL ENGINEERING	CO1	Classify the different types of soil using Indian Standards
	VR19	01	B.Tech-Civil Engineering			CO2	Analyse the permeability of soils and solve seepage related problems
	VR19	01	B.Tech-Civil Engineering			CO3	Evaluate the stresses transformed through soils and compute geostatic and induced stresses
	VR19	01	B.Tech-Civil Engineering			CO4	Evaluate the rate of consolidation, time rate of settlement and shear parameters of the effected by different drainage conditions

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

38	VR19	01	B.Tech-Civil Engineering	1003193160	g in C++	CO3	Apply the concepts of object-oriented programming
	VR19	01	B.Tech-Civil Engineering			CO4	Apply virtual and pure virtual function and complex programming situations
39	VR19	01	B.Tech-Civil Engineering	1003193160	INDUSTRIAL ROBOTICS	CO1	Summarize robot components, configurations and different end effectors
	VR19	01	B.Tech-Civil Engineering			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
	VR19	01	B.Tech-Civil Engineering			CO3	Analyse a given serial manipulator kinematically and dynamically
	VR19	01	B.Tech-Civil Engineering			CO4	Derive as well as analyse the equation of trajectory that the end-effector should follow given the boundary conditions
40	VR19	01	B.Tech-Civil Engineering	1001193180	TECHNICAL SEMINAR	CO1	Analyse a complex engineering problem and to apply principles of civil engineering and relevant disciplines to identify solutions
	VR19	01	B.Tech-Civil Engineering			CO2	Design, implement, and evaluate a solution to meet the requirements in the context of the civil engineering program's discipline
	VR19	01	B.Tech-Civil Engineering			CO3	Apply civil engineering fundamentals to produce proper solutions to real world problems.
	VR19	01	B.Tech-Civil Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.
41	VR19	01	B.Tech-Civil Engineering	1099193130	UNIVERSAL HUMAN VALUES AND PROFESSIONAL ETHICS	CO1	Relate Ethical Human Values
	VR19	01	B.Tech-Civil Engineering			CO2	Apply Engineering knowledge for societal benefits
	VR19	01	B.Tech-Civil Engineering			CO3	Demonstrate responsibility for Safety, Risk & rights
	VR19	01	B.Tech-Civil Engineering			CO4	Outline the various Current Global Issues
	VR19	01	B.Tech-Civil Engineering			CO1	Illustrate basic insights of management principles

42	VR19	01	B.Tech-Civil Engineering	1099192200	Management Science	CO2	Summarize Production process, and Inventory techniques
	VR19	01	B.Tech-Civil Engineering			CO3	Apply Strategies and policies to functional areas
	VR19	01	B.Tech-Civil Engineering			CO4	Understand Contemporary management Practices
43	VR19	01	B.Tech-Civil Engineering	1001193201	DESIGN OF STEEL STRUCTURES	CO1	Identify the failure modes of bolted and welded different connections, and determine their Understanding 1 design strengths.
	VR19	01	B.Tech-Civil Engineering			CO2	analyze and design tension members xompression members and beams
	VR19	01	B.Tech-Civil Engineering			CO3	create the solution for purlins to withstand the wind loads.
	VR19	01	B.Tech-Civil Engineering			CO4	design and complecated structurelike plategrider -1
44	VR19	01	B.Tech-Civil Engineering	1001193202	ENGINEERING GEOLOGY	CO1	Understand the failure of some civil engineering constructions due to geological drawbacks through some case histories
	VR19	01	B.Tech-Civil Engineering			CO2	Differentiate various rock forming minerals and economic minerals based on their physical properties and distinguish igneous, sedimentary and metamorphic rocks based on megascopic properties
	VR19	01	B.Tech-Civil Engineering			CO3	Describe the common geological structures associate within different rock strata and classify
	VR19	01	B.Tech-Civil Engineering			CO4	Investigate the project site or site selection for mega/mini civil engineering projects like Dams, Tunnels, disposal sites etc applying geological and geophysical methods such as Electrical resistivity method, seismic methods, gravity methods etc.
45	VR19	01	B.Tech-Civil Engineering	1001193203	ESTIMATION SPECIFICATIONS & CONTRACTS	CO1	Understand the preparation of an Abstract Estimate and detailed estimate of building
	VR19	01	B.Tech-Civil Engineering			CO2	Calculate the quantity of materials required for civil works as per specifications
	VR19	01	B.Tech-Civil Engineering			CO3	Determine earth work quantity for roads and canals
	VR19	01	B.Tech-Civil Engineering			CO4	Design bar bending schedule for reinforcement works, identify specifications and tendering process for contracts and create various tender documents for bidding purpose
46	VR19	01	B.Tech-Civil Engineering	1001193250	ADVANCED STRUCTURAL ANALYSIS	CO1	Analyze the two hinged and three hinged arches for different support levels
	VR19	01	B.Tech-Civil Engineering			CO2	Analyze structures using portal and cantilever methods
	VR19	01	B.Tech-Civil Engineering			CO3	Analyze Cable structures and plastic behavior of structures

	VR19	01	B.Tech-Civil Engineering		[illegible] ANALYSIS	CO4	Analyze structures using Kani's and Matrix methods.
47	VR19	01	B.Tech-Civil Engineering	1001193251	ENVIRONMENTAL POLLUTION CONTROL	CO1	Have knowledge on air pollutant control devices and the NAAQ standards.
	VR19	01	B.Tech-Civil Engineering			CO2	Differentiate the treatment techniques used for solid and industrial wastewater treatment methods.
	VR19	01	B.Tech-Civil Engineering			CO3	Appreciate the methods of environmental sanitation and the management of community facilities without spread of epidemics.
	VR19	01	B.Tech-Civil Engineering			CO4	Appreciate the importance of sustainable development while planning a project or executing an activity.
48	VR19	01	B.Tech-Civil Engineering	1001193252	GEOTECHNICAL ENGINEERING-II	CO1	Prepare the soil investigation report by using suitable field test
	VR19	01	B.Tech-Civil Engineering			CO2	Analyze stability of slopes using suitable methods
	VR19	01	B.Tech-Civil Engineering			CO3	Calculate the earth pressure values for design of retaining structures
	VR19	01	B.Tech-Civil Engineering			CO4	Determine the bearing capacity of the soil using different theories
49	VR19	01	B.Tech-Civil Engineering	1001193253	HYDRAULIC STRUCTURES	CO1	Correlate Water requirement of different crops in each season.
	VR19	01	B.Tech-Civil Engineering			CO2	Design lined & unlined canalwithout impacting the surroundings during floods.
	VR19	01	B.Tech-Civil Engineering			CO3	distinguish differentdrainage works and regulation works
	VR19	01	B.Tech-Civil Engineering			CO4	analyse the safety andstabilioty of gravity dams
50	VR19	01	B.Tech-Civil Engineering	1001193254	SUBSURFACE INVESTIGATION AND INSTRUMENTATION	CO1	Plan subsurface investigation based on the requirement of project and site condition
	VR19	01	B.Tech-Civil Engineering			CO2	Execute subsurface exploration tests, collect disturbed/undisturbed samples for laboratory tests and suggest design parameters
	VR19	01	B.Tech-Civil Engineering			CO3	Adopt suitable methods for estimation of soil properties required for design
	VR19	01	B.Tech-Civil Engineering			CO4	Work with relevant instrumentation required for characterizing the soil and rock with interdisciplinary approach.
51	VR19	01	B.Tech-Civil Engineering	1001193255	TRAFFIC ENGINEERING AND MANAGEMENT	CO1	Analyse Traffic Problems And Plan For Traffic Systems Various Uses Based on Traffic Surveys
	VR19	01	B.Tech-Civil Engineering			CO2	Design of intersection facilities including pedestrian facilities and cycle tracks
	VR19	01	B.Tech-Civil Engineering			CO3	Design of control devices for improving vehicular flows and Develop efficient Traffic Management Systems.
	VR19	01	B.Tech-Civil Engineering			CO4	Application of Traffic demand and management techniques for improving vehicular flows.
	VR19	01	B.Tech-Civil Engineering			CO1	Explain the concepts and drive train configurations of electric drive vehicles.

52	VR19	01	B.Tech-Civil Engineering	1002193260	ELECTRIC VEHICLES	CO2	Describe different electric propulsion systems and energy storage devices
	VR19	01	B.Tech-Civil Engineering			CO3	Discuss the technology, design methodologies and control strategy of electric vehicles.
	VR19	01	B.Tech-Civil Engineering			CO4	Explain battery charger topologies for electric vehicles and discuss how the sizing of the drive system is done and energy management strategies used in electric.
53	VR19	01	B.Tech-Civil Engineering	1019193260	Internet of Things	CO1	Understand the Architecture, protocols and applications of IoT.
	VR19	01	B.Tech-Civil Engineering			CO2	Analyse the communication protocols and standards used in IoT
	VR19	01	B.Tech-Civil Engineering			CO3	Design the simple IoT applications to monitor or control IoT devices using simulation or hardware
	VR19	01	B.Tech-Civil Engineering			CO4	implement real time applications
54	VR19	01	B.Tech-Civil Engineering	1005193261	OOPS THROUGH JAVA	CO1	Relate the procedural and object paradigm, with real world entities
	VR19	01	B.Tech-Civil Engineering			CO2	Use Exception handling and multithreading mechanisms to create efficient software application
	VR19	01	B.Tech-Civil Engineering			CO3	Implement GUI Applications with modern tools
	VR19	01	B.Tech-Civil Engineering			CO4	Design various layouts along with applet usage
55	VR19	01	B.Tech-Civil Engineering	1001193210	COMPUTER AIDED CIVIL ENGINEERING DRAWING	CO1	Make use of the conventional signs and symbols
	VR19	01	B.Tech-Civil Engineering			CO2	Draw the plan and sectional elevation of footing
	VR19	01	B.Tech-Civil Engineering			CO3	Design the plan, elevation and section of single storied and multi storied building
	VR19	01	B.Tech-Civil Engineering			CO4	Develop the plan and cross section of doglegged staircase
56	VR19	01	B.Tech-Civil Engineering	1001193270	MINI PROJECT-II	CO1	Analyse a complex engineering problem and to apply principles of civil engineering and relevant disciplines to identify solutions
	VR19	01	B.Tech-Civil Engineering			CO2	Design, implement, and evaluate a solution to meet the requirements in the context of the civil engineering program's discipline
	VR19	01	B.Tech-Civil Engineering			CO3	Apply civil engineering fundamentals to produce proper solutions to real world problems.
	VR19	01	B.Tech-Civil Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.
57	VR19	01	B.Tech-Civil Engineering	1001194111	GIS and Remote Sensing Applications	CO1	Retrieve the information content of remotely sensed data
	VR19	01	B.Tech-Civil Engineering			CO2	Compute an image visually and digitally with digital image processing techniques.
	VR19	01	B.Tech-Civil Engineering			CO3	illustrate GIS applications in Civil Engineering domain

	VR19	01	B.Tech-Civil Engineering			CO4	Analyze spatial and attribute data for solving spatial problems
58	VR19	01	B.Tech-Civil Engineering	1001194110	COMPUTER AIDED DESIGN LAB	CO1	Design of beams, columns and frames for RCC and steel by using Staad pro
	VR19	01	B.Tech-Civil Engineering			CO2	Design of slabs, towers, buildings and water tank by using Staad pro
						C03	At the end of the course the student acquires hands on experience in design
	VR19	01	B.Tech-Civil Engineering			CO4	Prepare structural drawings for concrete / steel structures normally encountered in Civil Engineering practice
59	VR19	01	B.Tech-Civil Engineering	1001194150	Prestressed Concrete	CO1	Understand the concepts of pre-stressing in concrete structures and identify the materials for pre-stressing
	VR19	01	B.Tech-Civil Engineering			CO2	Calculate the stresses, losses and deflections of pre and post tensioned memebers.
	VR19	01	B.Tech-Civil Engineering			CO3	Design flexure and shear reinforcement for prestressed concrete
	VR19	01	B.Tech-Civil Engineering			CO4	Interpet the torsional reinforcement and calculate the anchorage zone stresses in pre and post tension.
60	VR19	01	B.Tech-Civil Engineering		Railway, Airport and Harbour Engineering	CO1	Design geometrics in a railway track
	VR19	01	B.Tech-Civil Engineering			CO2	Illustrate the master plan and site selection for Railway station and airport
	VR19	01	B.Tech-Civil Engineering			CO3	Design geometrics for airfield pavements
	VR19	01	B.Tech-Civil Engineering			CO4	Plan, construct and maintain docks and harbours
	VR19	01	B.Tech-Civil Engineering	1001194155	INDUSTRIAL WASTE AND WASTE WATER ENGINEERING	CO1	Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation
	VR19	01	B.Tech-Civil Engineering			CO2	Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation
	VR19	01	B.Tech-Civil Engineering			CO3	Describe the common methods of treatment in different industries
	VR19	01	B.Tech-Civil Engineering			CO4	Explain operational problems of common effluent treatment plant
62	VR19	01	B.Tech-Civil Engineering	1001194152	CONSTRUCTION TECHNOLOGY AND MANAGEMENT	CO1	Construct network diagrams and compute critical path, slack and floats for a given network diagram.
	VR19	01	B.Tech-Civil Engineering			CO2	Apply techniques to optimize time, cost and manpower resources.
	VR19	01	B.Tech-Civil Engineering			CO3	Identify the suitable equipment for performing different construction operations.
	VR19	01	B.Tech-Civil Engineering			CO4	Understand the fundamentals of quality management and safety management systems in construction industry
	VR19	01	B.Tech-Civil Engineering		PAVEMENT	CO1	Understand The basic of components of pavement, stresses occurred in pavement and the basic elements in design of flexible pavement

63	VR19	01	B.Tech-Civil Engineering	1001194156	ANALYSIS AND DESIGN	CO2	Design of the flexible pavements along with various Standard methods
	VR19	01	B.Tech-Civil Engineering			CO3	Design of the Rigid pavements along with various standard methods
	VR19	01	B.Tech-Civil Engineering			CO4	Analysis of Temperature stresses, reinforced slabs
64	VR19	01	B.Tech-Civil Engineering	1001194153	ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT	CO1	Understand evaluate and create the basic concept of environmental impact assessment, Flow of EIA, Types of environmental Impacts
	VR19	01	B.Tech-Civil Engineering			CO2	Implement different methods in preparing an Environmental Impact Statement
	VR19	01	B.Tech-Civil Engineering			CO3	Identify various mitigation measures that can be used.
	VR19	01	B.Tech-Civil Engineering			CO4	Access environmental impacts and indicate their potential risks through environmental indices and indicators
65	VR19	01	B.Tech-Civil Engineering	1001194158	SOIL DYNAMICS AND FOUNDATIONS	CO1	Analyse the vibration related problems in foundations
	VR19	01	B.Tech-Civil Engineering			CO2	Design the various machine foundations with respect to Indian standards
	VR19	01	B.Tech-Civil Engineering			CO3	Conduct the various types of tests to find the dynamic properties of the soil
	VR19	01	B.Tech-Civil Engineering			CO4	Calculate the dynamic bearing capacity of soil under shallow and pile foundations
66	VR19	01	B.Tech-Civil Engineering	1001194157	FINITE ELEMENT METHOD	CO1	Understand the basic concepts in Finite element method
	VR19	01	B.Tech-Civil Engineering			CO2	Analyse the one dimensional and two-dimensional problems in finite element method
	VR19	01	B.Tech-Civil Engineering			CO3	Solve one dimensional problem
	VR19	01	B.Tech-Civil Engineering			CO4	Apply the shape functions and Isoperimetric elements in finite element evaluation
67	VR19	01	B.Tech-Civil Engineering	1001194154	GROUND IMPROVEMENT TECHNIQUES	CO1	Decide the suitable ground improvement method and their suitability to different field situations
	VR19	01	B.Tech-Civil Engineering			CO2	Design a reinforced earth embankment and check its stability.
	VR19	01	B.Tech-Civil Engineering			CO3	Analyse the various functions of Geosynthetics and their applications in Civil Engineering practice
	VR19	01	B.Tech-Civil Engineering			CO4	Analyse the various functions of Geosynthetics and their applications in Civil Engineering practice
	VR19	01	B.Tech-Civil Engineering			CO1	Discuss the fundamental principles of nanotechnology and their application to biomedical engineering

68	VR19	01	B.Tech-Civil Engineering	1003194160	NANO TECHNOLOGY	CO2	Apply engineering and physics concepts to the nano-scale and non- continuum domain.
	VR19	01	B.Tech-Civil Engineering			CO3	Choose appropriate synthesis technique to synthesize quantum nanostructures of desired size, shape and surface properties
	VR19	01	B.Tech-Civil Engineering			CO4	Evaluate state-of-the-art, characterization methods for nanomaterials, and CO4 determine nanomaterial safety and handling methods required during characterization
69	VR19	01	B.Tech-Civil Engineering	1003194154	POWER PLANT ENGINEERING	CO1	Understand the working principle of steam power plant and its circuits
	VR19	01	B.Tech-Civil Engineering			CO2	Illustrate the working of diesel and gas power plant and its components and compare it with steam power plant
	VR19	01	B.Tech-Civil Engineering			CO3	Evaluate the performance of Hydro power plants and explain the components and working nuclear power plants
	VR19	01	B.Tech-Civil Engineering			CO4	Analyze the economics involved in power plant
70	VR19	01	B.Tech-Civil Engineering	1005194160	INTRODUCTION TO MACHINE LEARNING	CO1	Recognise the characteristics of machine learning that make it useful to real- world problems
	VR19	01	B.Tech-Civil Engineering			CO2	Characterise the machine learning algorithms as supervised, semi-supervised and un-supervised
	VR19	01	B.Tech-Civil Engineering			CO3	Use support vector machine, regularized regression algorithms
	VR19	01	B.Tech-Civil Engineering			CO4	Understand the concept behind neural networks for learning non-linear functions
71	VR19	01	B.Tech-Civil Engineering	1001194270	MAIN PROJECT /INTERNSHIP	CO1	Analyse the entrepreneurship design and the business environment
	VR19	01	B.Tech-Civil Engineering			CO2	Define industrial policies
	VR19	01	B.Tech-Civil Engineering			CO3	Explain the business preparation
	VR19	01	B.Tech-Civil Engineering			CO4	Integrate the knowledge of various courses and their applications in industry

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