VR17
COURSE OUTCOMES

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VR17 - 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	2058171101	Advanced Data Structures and Algorithm Analysis	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,
58	M.Tech-Computer Science and Engineering	2058171102	Mathematical Foundations of Computer Science	CO1	Distinguish Propositional Logic from Predicate Logic. Analyzing.
				CO2	Practice problems related to fundamental theorems.
				CO3	Enumerate the basic algorithms in number theory.
				CO4	computer science p.
58	M.Tech-Computer Science and Engineering	2058171103	Computer Organization and Architecture	CO1	Understand the architecture and data representation in modern computer.
				CO2	Examine Combinational and Sequential Circuits.
				CO3	Compare Memory mapping techniques.
				CO4	Implement Computer Arithmetic Operations .
58	M.Tech-Computer Science and Engineering	2058171104	Database Management Systems	CO1	Identify the role of Database Management System for maintenance of
				CO2	Apply Relational Model to design and manipulate a Database.
				CO3	Design a Database using Normalization techniques.
				CO4	Outline Database Concurrent transactions and Storage methods.
58	M.Tech-Computer Science and Engineering	2058171105	Advanced Operating Systems	CO1	architecture and distributed mutual exclusion.
				CO2	Analyze on deadlock detection algorithms and agreement protocols.
				CO3	protection and security in distributed operating systems.
				CO4	systems.
58	M.Tech-Computer Science and Engineering	2058171106	Data Warehousing And Data Mining	CO1	Implement data warehouse for heterogeneous data.
				CO2	Analyze real time datasets with basic summary statistics.
				CO3	Construct a decision tree to resolve the problem of model over fitting.
				CO4	frequent itemset generation.
58	M.Tech-Computer Science and Engineering	2058171121	CSE Lab – 1	CO1	Implement linear and non linear data structures using C language.
				CO2	Develop C programs for searching and sorting techniques.
				CO3	Develop C Programs for generate min-cost spanning tree.
				CO4	Develop C programs for process scheduling, Memory Management,
58	M.Tech-Computer Science and Engineering	2058171132	Technical Seminar -1	CO1	Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of
				CO2	Simulate and analyze the results reported in the chosen paper for seminar
				CO3	Communicate effectively before the expert panel and develop technical
				CO4	Respond to the queries raised by the evaluation committee and audience.
58	M.Tech-Computer Science and Engineering	2058171201	Cyber Security	CO1	Explain the fundamentals of Encryption Algorithms.
				CO2	Make use of Public Key Cryptographic Algorithms.
				CO3	Choose the various Authentication applications of security.
				CO4	Demonstrate the functionalities of Firewalls.
58	M.Tech-Computer Science and Engineering	2058171202	Computer Networks	CO1	Interpret data communication models using OSI/ISO and
				CO2	Outline Physical Layer communication.
				CO3	Analyze protocols implemented in data link layer for error and flow control.
				CO4	Analyze the features and operations of different MAC mechanisms.
58	M.Tech-Computer Science and Engineering	2058171203	Big Data Analytics	CO1	Implement data structures required for developing map reduce programs.
				CO2	Interpret Hadoop's architecture and core components of Hadoop Distributed
				CO3	paradigm.
				CO4	Analyze interfaces for Hadoop I/O.
58	M.Tech-Computer Science and Engineering	2058171204	Advanced Unix Programming	CO1	Make use of basic UNIX commands.
				CO2	Analyze file system architecture to organize the file system.
				CO3	Analyze shell command line structure .
				CO4	Illustrate the usage of filters in AWK language.
58	M.Tech-Computer Science and Engineering	2058171205	Software Engineering	CO1	Analyze software development process models and their suitability to
				CO2	Develop SRS document for software design.
				CO3	Employ software architectural styles to design user interface.
				CO4	Compare software testing approaches and aspects.
58	M.Tech-Computer Science and Engineering	2058171206	Artificial Intelligence	CO1	Apply Artificial Intelligence in Game Playing.
				CO2	Identify problem solving and reduction strategies in AI.
				CO3	Outline logic concepts in AI.
				CO4	Analyze the current knowledge representation techniques in AI.
58	M.Tech-Computer Science and Engineering	2058171207	Compiler Design	CO1	Outline lexical analyzer.
				CO2	Construct top down parsers.
				CO3	Construct SLR, CLR, LALR bottom up parsers.
				CO4	Develop intermediate code by analyzing semantic analysis phase.
58	M.Tech-Computer Science and Engineering	2058171208	Machine Learning	CO1	Recognize the characteristics of machine learning that make it useful to real-
				CO2	Characterize machine learning algorithms as supervised, semi-supervised,
				CO3	Be able to use support vector machine, regularized regression algorithms.
				CO4	Understand the concept behind neural networks for learning non-linear
58	M.Tech-Computer	2058171209	Image	CO1	Analyze algorithms for various graphics shapes such as line,circle by
				CO2	Apply geometric transformations in 2D necessary for programming computer

58	Science and Engineering	2058171209	Processing	CO3	Apply Image Processing operations to color images.
				CO4	Identify suitable Image segmentation algorithm and compare data
58	M.Tech-Computer Science and Engineering	2058171210	Parallel Algorithms	CO1	Apply various scheduling algorithms for parallel Processors.
				CO2	Discuss Parallel algorithms on SIMD and MIMD machines.
				CO3	Apply various algorithms for Dictionary operations.
				CO4	Apply various parallel algorithms for Graph Searching.
58	M.Tech-Computer Science and Engineering	1099192100	Cloud Computing	CO1	Differentiate among various cloud offerings, cloud environments, distributed
				CO2	Analyze various cloud platforms and cloud applications.
				CO3	Survey the policies and mechanisms for resource management, performance,
				CO4	Choose among different storage technologies for cloud like DFS, GFS,
58	M.Tech-Computer Science and Engineering	2058171211	Mobile Computing	CO1	Illustrate GSM Architecture in wireless networks.
				CO2	Select efficient Medium access control mechanism.
				CO3	Outline the functionality of a mobile agent in network layer.
				CO4	Explain transport layer protocols of mobile node and its database issues.
58	M.Tech-Computer Science and Engineering	2058171212	CSE Lab – 2	CO1	Implement connection oriented and connectionless protocols.
				CO2	Implement the SMTP, FTP & HTTP.
				CO3	Implement Socket System call.
				CO4	Implement inter process communication using shared memory.
58	M.Tech-Computer Science and Engineering	2058171232	Technical Seminar -2	CO1	Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the domain of
				CO2	Simulate and analyze the results reported in the chosen paper for seminar
				CO3	Communicate effectively before the expert panel and develop technical
				CO4	Respond to the queries raised by the evaluation committee and audience.
58	M.Tech-Computer Science and Engineering	2058171235	Comprehensive Exam	CO1	Demonstrate knowledge in the program domain.
				CO2	Present views cogently and precisely.
				CO3	Exhibit professional etiquette suitable for career progression.
				CO4	Apply computer science theory and software development fundamentals to produce
58	M.Tech-Computer Science and Engineering	2058172138	Project Work (Stage- 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
				CO4	Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems.
58	M.Tech-Computer Science and Engineering	2058172238	Project Work (Stage- 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.

PRINCIPAL
GNAN'S INSTITUTE
rmation Technology
VSEZ, Duvvada, Visakhapatnam

VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY					
DEPARTMENT OF IT					
VR17 - COURSE OUTCOMES					
Programme Code	**Programme Name**	**Course Code**	**Course Name**	**CO**	**Course Outcome: After the completion of the course student will be able to**
40	M.Tech-Information Technology	2040171101	Advanced Data Structures	CO1	complexity.
				CO2	Elaborate and implement the proper usage of advanced abstract data type (ADT) and data structures and their implementations.
				CO3	Interpret various algorithm design techniques (brute-force, divide and conquer, greedy,etc.
				CO4	Execute learned algorithm design techniques and data structures to solve real world problems.
40	M.Tech-Information Technology	2040171102	Advanced Graph Theory	CO1	Reproduce the proofs of all fundamental statements on graphs.
				CO2	Evaluate and apply graph interpretations(distance, metrics) to solve new graph problems.
				CO3	Apply graph theory knowledge in computer science applications.
				CO4	Design and implement the graph colouring strategies and computing hard graph problems.
40	M.Tech-Information Technology	2040171103	Parallel Algorithms	CO1	decomposition techniques.
				CO2	Use different performance metrics for analysis of parallel algorithms.
				CO3	multithreading.
				CO4	Execute implicit and explicit parallel platform.
40	M.Tech-Information Technology	2040171104	Data Mining And Knowledge Discovery	CO1	Identify stages in building a Data Warehouse and challenges in Data mining.
				CO2	Access raw input data and apply data pre-processing techniques, generalization techniques and data characterization techniques to provide suitable input for a range of data mining algorithms.
				CO3	Analyze data mining techniques like classification and Association rules that can be applied to data objects and to find the interesting patterns.
				CO4	Solve real world problems by using the various Clustering methods.
40	M.Tech-Information Technology	2040171105	Advanced Computer Networks	CO1	Develop and evaluate distributed application architectures according to functional requirements.
				CO2	Design IPv6 based computer networks.
				CO3	Select appropriate quality of service mechanisms for a give computer network.
				CO4	Plan the interworking of distributed application basing on Semantic Web technology.
40	M.Tech-Information Technology	2040171106	Web Technologies	CO1	Analyze a web page and identify its elements and attributes to create web
				CO2	Compile the basic concepts of Java Scripts to design dynamic web pages.
				CO3	Analyze a given problem and apply requisite appropriate tools for
				CO4	Develop fully functional web application through client and server
40	M.Tech-Information Technology	2040171121	IT Lab – I	CO1	environment.
				CO2	communication.
				CO3	Visualize datasets using data mining techniques like classification and
				CO4	real world problems.
40	M.Tech-Information Technology	2040171132	Technical Seminar - 1	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
				CO3	Communicate effectively before the expert panel and develop technical
				CO4	Respond to the queries raised by the evaluation committee and audience.
40	M.Tech-Information Technology	2040171201	Advanced Unix Programming	CO1	Execute UNIX commands for file handling and process control.
				CO2	Interpret Regular expressions for pattern matching and apply them to various filters for a specific task.
				CO3	Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem.
				CO4	Review the architecture and features of UNIX Operating System and distinguish it from other Operating System.
40	M.Tech-Information Technology	2040171202	Cyber Security	CO1	Design, develop, test and evaluate secure software.
				CO2	Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure.
				CO3	Evaluate and communicate the human role in security systems with an emphasis on ethics, social engineering vulnerabilities and training.
				CO4	develop policies and procedures to manage enterprise security risks.

40	M.Tech-Information Technology	2040171203	Big Data Analytics	CO1	Analyze Hadoop Architecture.
				CO2	Acquire knowledge on Map Reduce Framework and implement various
				CO3	Develop applications using java language and implement programs by
				CO4	Implement Big data activities using PIG and HIVE.
40	M.Tech-Information Technology	2040171204	Cloud Computing	CO1	apply the knowledge of cloud technology to demonstrate the working
				CO2	analyse cloud services extended by various cloud providers to build a
				CO3	Identify emerging cloud programming paradigms and its software
				CO4	Design and develop the backup strategies for cloud data based on features.
40	M.Tech-Information Technology	2040171205	Adhoc & Sensor Networks	CO1	Minimise and deploy the challenges in designing MAC, routing and transport protocols for wireless ad-hoc/sensor networks.
				CO2	Comprehend the various sensor network Platforms, tools and applications.
				CO3	resolve the unique issues in ad-hoc/sensor networks.
				CO4	Implement designing routing and transport protocols for wireless Ad-hoc/sensor networks.
40	M.Tech-Information Technology	2040171206	Semantic Web services	CO1	Interpret the basics of Semantic Web and Social Network.
				CO2	Design and apply knowledge representation for developing semantic web.
				CO3	Analyze the web Intelligence.
				CO4	Evaluate Web- based social network and Ontology.
40	M.Tech-Information Technology	2040171207	Principles Of Programming Languages	CO1	Able to understand syntax and semantics of programming languages.
				CO2	Able to understand variables, data types, and basic statements.
				CO3	oriented concepts.
				CO4	Able to understand and adopt new programming languages.
40	M.Tech-Information Technology	2040171208	Internet Of Things	CO1	Analyze and formulate the Architecture, protocols and applications of IoT.
				CO2	Analyse and design the communication protocols and standards used in
				CO3	Analyse and design the simple IoT applications to monitor or control IoT
				CO4	Implement the real time IoT applications.
40	M.Tech-Information Technology	2040171209	Machine Learning	CO1	Recognize the characteristics of machine learning and differentiate machine learning algorithms into supervised, unsupervised and semi supervised.
				CO2	Solve classification problems using concept learning and decision trees.
				CO3	Interpret of Dimensionality Reduction and vector machine algorithms.
				CO4	Identify the concept behind neural networks for learning non-linear functions.
40	M.Tech-Information Technology	2040171210	Information Retrieval System	CO1	iidentify the similarity of query and document.
				CO2	errors.
				CO3	and k-means algorithm.
				CO4	Design the method to build inverted index.
40	M.Tech-Information Technology	2040171211	Image Processing & Pattern Recognition	CO1	Execute various filters and arithmetic operations in image processing.
				CO2	techniques.
				CO3	theories.
				CO4	ordering in real world domain.
40	M.Tech-Information Technology	2040171212	Software Testing Methodologies	CO1	Figure out practical solutions to the problems for various applications.
				CO2	Define, formulate and analyze test cases for given problem domain.
				CO3	Manage testplans and testmodels for project from beginning to end.
				CO4	Finding out implementation of different strategies to replace errors.
40	M.Tech-Information Technology	2040171221	IT LAB – 2	CO1	shell scripting.
				CO2	communication.
				CO3	Evaluate different encryption algorithms on number theory.
				CO4	real world problems.
40	M.Tech-Information Technology	2040171232	Technical Seminar - 2	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
				CO3	Communicate effectively before the expert panel and develop technical
				CO4	Respond to the queries raised by the evaluation committee and audience.
40	M.Tech-Information Technology	2040171235	Comprehensive Exam	CO1	Analyze a complex computing problem and to apply principles of computing and relevant disciplines to idenitfy solutions .
				CO2	Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
				CO3	Apply computer science theory and software development fundamentals to produce computing-based solutions.

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)

DEPARTMENT OF MECHANICAL ENGINEERING

VR17 - 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	2015171101	Computational Methods In Engineering	CO1	• Understand numerical methods for engineering problems
				CO2	• Apply numerical methods to solve the boundary value problems
				CO3	• Apply numerical solution to discrete Fourier transform (DFT) and
				CO4	• Apply numerical solutions of partial differential equations.
15	M.Tech-Machine Design	2015171102	Advanced Mechanics of Solids	CO1	• Formulate the stress strain tensor
				CO2	• Design the failure theories
				CO3	• Establish the idea of bending of beams
				CO4	• Apply the concept of contact stresses
15	M.Tech-Machine Design	: 2015171103	Advanced Mechanisms	CO1	• Understand the various elements in of mechanism for plane
				CO2	• Analyze the synthesis of mechanism for a plane motion with
				CO3	• Analyze the motion in plane motion in mechanism graphically
				CO4	• Evaluate the maipulator kinematics with D-H notation
15	M.Tech-Machine Design	2015171104	Mechanical Vibrations	CO1	• Understand the importance of vibrations in mechanical design of machine parts that operate in vibratory conditions and know
				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	: 2015171105	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 dual 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	2015171106	DESIGN OF AUTOMOBILE SYSTEMS	CO1	• Understand the safety and conseptual design of Automobiles
				CO2	• Evaluate design of structural elements and load analysis for different vehicles based on cornering loads
				CO3	• Understand Vehicle ergonomics, Suspension system for ride comfort and methods of mounting suspension systems
				CO4	• Analyze Safety aspects of automobiles and energy absorbing systems through testing(lab, field testing).
15	M.Tech-Machine Design	2015171107	PRODUCT DESIGN	CO1	• Dustumer survey and identify the custmer requirment
				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	: 2015171108	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	2015171109	DESIGN SYNTHESIS	CO1	• Describe the role of analysis and synthesis in the design process
				CO2	• Understand Tolerance from process and function
				CO3	• Describe the design methods for forging, assembly and
				CO4	• Develop problems formulation for design optimization
15	M.Tech-Machine Design	2015171121	MACHINE DYNAMICS LAB	CO1	• Interpret the damped and undamped natural frequency and
				CO2	• Calculate the balancing of masses in static and dynamic cases
				CO3	• Estimate the magnitude of gyroscopic couple, angular velocity of
				CO4	• Analyse the Direct and Inverse kinematic of a robot
15	M.Tech-Machine Design	2015171132	TECHNICAL SEMINAR-I	CO1	: Carryout literature survey, and choose a relevant topic reported in recent IEEE/Springer/SAGE/ conference publications / transactions in the domain of mechanical engineering
				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	: 2015171201	OPTIMIZATION AND RELIABILITY	CO1	• Understand the concept of optimization techniques and
				CO2	• Evaluate the basics of different algorithms
				CO3	• Solve multi objective optimisation techniques
				CO4	• Analyze different alogatithms and optimization technques
15	M.Tech-Machine Design	2015171202	EXPERIMENTAL STRESS ANALYSIS	CO1	• Understand the various stresses in 2D and 3D objects
				CO2	• Analyze the working strain recording systems
				CO3	• Analyze the photo elasticity & its measurement
				CO4	• Evaluate the strains using brittle coatings amnd moire methods

				CO4	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
40	M.Tech-Information Technology	2040172138	Project Work(Stage-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	Perform individually as well as in a team, accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success.
				CO3	Use formal and informal communications with team members and guide, make presentations and prepare technical document.
				CO4	Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems.

VIGNA. ITUTE OF
Informati nology (A)
Beside: VSEZ, Du .sakhapatnam-49

15	M.Tech-Machine Design	2015171203	FINITE ELEMENT METHOD	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	2015171204	SIGNAL ANALYSIS AND CONDITION MONITORING	CO1	• Understand basic concepts of Fourier analysis, Bandwidth.
				CO2	• Analysis of stationary signals.
				CO3	• Analysis of continuous non-stationary signals.
				CO4	• Apply condition monitoring in real systems
15	M.Tech-Machine Design	2015171205	Acoustics and Noise Control	CO1	• Understand the basic concepts of Acoustics and Noise control
				CO2	• Identify the different sources of noise from various machine componets bearing, gears motors, fans propellers, generator sets,
				CO3	• Apply the knowledge of noise ratings, standards and levels in the design of Engine and muffler design.
				CO4	• Analyse the vehicular noise and environmental noise and control the noise using diffrent noise control techniques
15	M.Tech-Machine Design	2015171206	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
15	M.Tech-Machine Design	2015171207	TRIBOLOGY	CO1	• Illustrate the fundamentals of tribology and the tribological parameters of all classes of materials
				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	2015171208	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	2015171209	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	• Evaluate various structural sections
15	M.Tech-Machine Design	: 2015171210	CONTINUUM MECHANICS	CO1	• Understand the continuum mechanics.
				CO2	• Solve the continuum mechanics problem using Eulerian and
				CO3	• Use the laws of continuum mechanics for mass conservation and
				CO4	• Use the continuum mechanics theories for Elastic Materials, Viscous fluids, linear visco- elasticity
15	M.Tech-Machine Design	2015171211	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	2015171212	PRESSURE VESSEL DESIGN	CO1	• To identify different materils of pressure vessels and select the
				CO2	• Design dome bends, shell connections, flat heads and cone
				CO3	• Analyse the discontinuity stresses in vessels.
				CO4	• Evaluate the stress theory of failure of vessels subject to steady
15	M.Tech-Machine Design	: 2015171213	GEAR ENGINEERING	CO1	• Organize the gear production processes
				CO2	• Inspect the gear wheel for its correct profile
				CO3	• Decide the type of gear used for a particular application
				CO4	• Propose a correct gear for transmitting the various loads coming
15	M.Tech-Machine Design	2015171214	MECHATRONICS	CO1	• Understand the design considerations of mechatronics systems, intelligent machines, automatic machines, and various actuating
				CO2	• Develop motion control algorithms and mechanical configurations
				CO3	• Analyze sensor interfacing and architecture of intelligent
				CO4	• Assess the machine vision concept and various micro
15	M.Tech-Machine Design	2015171215	DESIGN FOR MANUFACTURING AND 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	2015171221	DESIGN PRACTICE LABORATORY	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	2015171232	TECHNICAL SEMINAR-II	CO1	: Carryout literature survey, and choose a relevant topic reported in recent IEEE/Springer/SAGE/conference publications / transactions in the domain of mechanical engineering
				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	2015171235	COMPREHENSIVE EXAM	CO1	: Demonstrate knowledge in the program domain.
				CO2	: Present views cogently and precisely.
				CO3	Exhibit professional etiquette suitable for career progression.
				CO4	Apply mechanical engineering theory and software development fundamentals to produce experimental and computing-based

PRINCIPAL
VIGNAN'S INSTITUTE OF
Information Technology (A)
Beside: VSEZ, Duvvada, Visakhapatnam-4

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)					
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING					
VR - 17 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	2042171101	ELECTRICAL MACHINE MODELING & ANALYSIS	CO1	Understand the behavior of DC motors and also model the different Dc motors.
				CO2	Apply the knowledge of reference frame theory for AC machines to model the induction and Synchronous
				CO3	Evaluate the steady state and transient behaviour of induction and synchronous machines to Propose the suitability of drives for different industrial applications.
				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	2042171102	ANALYSIS OF POWER ELECTRONIC CONVERTERS	CO1	Examine the operation of phase controlled converters and AC voltage converters.
				CO2	Determine the requirements of power factor correction in converter circuits.
				CO3	Analyze the operation of 3-phase inverters with and without PWM techniques.
				CO4	Describe principles of operation and features of
42	M.Tech-Power and Industrial Drives	2042171103	POWER ELECTRONIC CONTROL OF DC DRIVES	CO1	Describe the single phase and three phase converter fed
				CO2	Investigate the two quadrants and four quadrant controls of DC motor drives.
				CO3	Develop the mathematical models of DC drive
				CO4	Analyze the four quadrant and closed loop control of DC-DC converter fed DC drive.
42	M.Tech-Power and Industrial Drives	2042171104	FLEXIBLE AC TRANSMISSION SYSTEMS	CO1	Learn about the transmission system's performance improvement using FACTS.
				CO2	Understand about the impact of series compensation
				CO3	recognize the impact of UPFC'S.
				CO4	Determine an appropriate FACTS device for different types of applications.
42	M.Tech-Power and Industrial Drives	2042171105	MODERN CONTROL THEORY	CO1	Understand the state variable approach's which are suitable for higher order systems.
				CO2	Analyze the concepts of controllability and observability.
				CO3	Examine the various non-linearities using phase plane analysis and descriptive functions.
				CO4	Learn stability and instability problems in continuous time invariant systems.
42	M.Tech-Power and Industrial Drives	2042171106	POWER QUALITY	CO1	Have the knowledge on causes of power quality, power quality parameters and sources of transient over voltages and providing protection to transient over voltages.
				CO2	Understand the effects of harmonics, sources of harmonics and harmonic minimization.
				CO3	Analyze long duration voltage variations and regulation of voltage variations. □
				CO4	Describe power quality aspects in distributed generation and develop solutions to wiring and grounding problems
42	M.Tech-Power and Industrial Drives	2042171107	OPTIMIZATION TECHNIQUES	CO1	State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem.
				CO2	Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution.
				CO3	Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal
				CO4	Utilize gradient and non-gradient methods to nonlinear optimization problems and use interior or exterior penalty functions for the constraints to derive the optimal
				CO5	Solve practical problems using PSO and genetic algorithms for simple electrical problems.
42	M.Tech-Power and Industrial Drives	2042171108	ENERGY AUDITING, CONSERVATION&	CO1	Perform energy audit in different organizations.
				CO2	Recommend energy efficient motors and design good
				CO3	Understand the advantages to improve the power factor.

	Drives		MANAGEMENT	CO4	Evaluate the depreciation of equipment.
42	M.Tech-Power and Industrial Drives	2042171109	ARTIFICIAL INTELLIGENCE TECHNIQUES	CO1	Understand the different types of neural networks.
				CO2	Develop algorithms using genetic algorithm for optimization and training algorithms for neural
				CO3	Design the fuzzy logic controllers for different systems.
				CO4	Apply AI Techniques in power electronics and DC
42	M.Tech-Power and Industrial Drives	2042171110	HVDC TRANSMISSION	CO1	Understand the various schemes and protection schemes of HVDC transmission.
				CO2	Identify the basic HVDC transmission equipment.
				CO3	Explain the control of HVDC systems.
				CO4	Discover the interaction of HVDC system and the
42	M.Tech-Power and Industrial Drives	2042171121	SIMULATION LABORATORY	CO1	Examine power semiconductor device properties via
				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	2042171201	SWITCHED MODE POWER CONVERSION	CO1	Analyse the control operation of non-isolated switch mode converters and switch mode converters with small
				CO2	Explain the operation of isolated switch mode
				CO3	Analyse the control schemes for resonant converters and design of magnetic components.
				CO4	Design the non-isolated switch mode converters based on linearization.
				CO5	Examine the operation of resonant converters and soft
42	M.Tech-Power and Industrial Drives	2042171202	POWER ELECTRONIC CONTROL OF AC DRIVES	CO1	Explain operation of induction motor and analyse speed control of AC drivesby VSI fed drives.
				CO2	Understand the vector control of induction motors and operation of traction drives.
				CO3	Analyze control schemes to synchronous motor drives.
				CO4	Recognize the control of stepper motor and switching reluctance motor.
42	M.Tech-Power and Industrial Drives	2042171203	DIGITAL CONTROLLERS	CO1	Discover the input and output interfaces for PIC microcontrollers and DSP processors.
				CO2	Acknowledging how to develop ALP for DSP
				CO3	Design PWM controls for power electronic circuits using
				CO4	Explain the operation of the ADC in the DSP and overview of the Event manager (EV) , Event Manager Interrupts , General Purpose (GP) Timers.
42	M.Tech-Power and Industrial Drives	2042171204	SPECIAL MACHINES	CO1	Apply the knowledge of sensors used in PMSM which can be used for controllers and synchronous machines.
				CO2	Analyze the characteristics of different types of PM type brushless DC motors and the different controllers used in electrical machines to propose the suitability of drives
				CO3	Classify the types of DC linear motors and apply the knowledge of controllers to propose their application in
				CO4	Evaluate the steady state and transient behavior linear induction motors.
42	M.Tech-Power and Industrial Drives	2042171205	RENEWABLE ENERGY SYSTEMS	CO1	Identify and adopt the different alternate energy sources for power generation.
				CO2	Classify the different renewable energy systems.
				CO3	Analyze the different renewable energy systems.
				CO4	Integrate the various sources and the grid in the best
42	M.Tech-Power and Industrial Drives	2042171206	REACTIVE POWER COMPENSATION & MANAGEMENT	CO1	Understand the different types of compensation and their
				CO2	Discover different load compensations schemes.
				CO3	Obtain the mathematical model of reactive power compensating devices.
				CO4	Know the application of reactive power compensation in electrical traction & arc furnaces.
42	M.Tech-Power and Industrial Drives	2042171207	ELECTRICAL DISTRIBUTION SYSTEMS	CO1	Analyze the distribution networks for V-drops, PLoss calculations and reactive power
				CO2	Design equipment for compensation of losses in the distribution system.
				CO3	Create protective systems and coordinate the devices.
				CO4	Understand the capacitive compensation and voltage
42	M.Tech-Power and Industrial Drives	2042171208	CUSTOM POWER DEVICES	CO1	Analyze the effect of various power quality issues in distribution system and their mitigation principles.
				CO2	Describe the operation of custom power devices for reactive power & harmonic compensation.
				CO3	Operate the high speed transfer switches.

				CO4	Examine the operation and control of custom power devices in power system applications.
42	M.Tech-Power and Industrial Drives	2042171209	SMART GRID TECHNOLOGIES	CO1	Analyze the smart grid policies and developments in
				CO2	Develop concepts of smart grid technologies in hybrid electrical vehicles etc.
				CO3	Understand the effect of smart substations, feeder automation, GIS, micro grids and distributed generation
				CO4	Discover 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	2042171210	PROGAMMABLE LOGIC CONTROLLERS & APPLICATIONS	CO1	Understand the PLCs and their I/O modules.
				CO2	Develop control algorithms to PLC using ladder logic
				CO3	Manage PLC registers for effective utilization in different applications and also handle data functions & control of two axis, their axis robots with PLC.
				CO4	Design PID controller with PLC.
42	M.Tech-Power and Industrial Drives	2042171221	POWER CONVERTERS AND DRIVES LAB	CO1	Explain the working of phase controlled converters, AC voltage controllers and DC-DC converters.
				CO2	Analyze the phase controlled converters, AC voltage controllers, DC-DC converters and PWM inverters.
				CO3	Examine the three phase SVPWM Pulse generation using PIC Micro controller/DSP processor and DSP based V/F Control of 3 phase Induction motor.
				CO4	Investigate the speed control and operation of power converter fed motors.

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

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VR17 - COURSE OUTCOMES

SNO	Programme	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
1	25	M.Tech-Software Engineering	2025171101	Software Requirements and Estimation	CO1	Develop Different diagrams for software requirements.
					CO2	Apply traceability matrix in requirements management
					CO3	Apply metrics to estimate size
					CO4	List the software cost estimation tools
2	25	M.Tech-Software Engineering	2025171102	Software Metrics and Reuse	CO1	Describe the Quality Metrics used for Software maintenance
					CO2	Apply Quality tools for Development of Software
					CO3	Make use of Function Point Metrics to Measure Software Process
					CO4	Illustrate the Application frame work used for reuse.
3	25	M.Tech-Software Engineering	2025171103	Software Project and Process Management	CO1	understand the basic concepts and issues of software project
					CO2	conduct activities necessary to successfully complete and close the
					CO3	implement the project plans through managing people.
					CO4	develop the skills for tracking and controlling software deliverables
4	25	M.Tech-Software Engineering	2025171104	Web Technologies	CO1	Develop client-side scripts with JavaScript and DHTML.
					CO2	Apply XML for web document with XML parsers
					CO3	Build web applications using PHP My SQL &AJAX.
					CO4	Develop PERL scripts for web applications.
5	25	M.Tech-Software Engineering	2025171105	Big Data Analytics	CO1	Implement data structures required for developing map reduce
					CO2	Interpret Hadoop's architecture and core components of Hadoop
					CO3	Apply data modelling techniques to large data sets using map reduce
					CO4	Analyze interfaces for Hadoop I/O.
6	25	M.Tech-Software Engineering	2025171106	Scripting Languages	CO1	Develop PERL scripts for web applications.
					CO2	Summarize the concepts of PHP scripting language.
					CO3	Build web applications using PHP
					CO4	Design applications using TCL
7	25	M.Tech-Software Engineering	2025171121	SE Lab 1	CO1	Demonstrate the constructs of Ruby scripting Language, use of Perl
					CO2	Implement PERL program to connect to MySQL database
					CO3	Implement Map Reduce Program for weather data
					CO4	Implement PHP program for cotactuspage.
8	25	M.Tech-Software Engineering	2025171132	Technical Seminar - 1	CO1	Carryout literature survey, and choose a relevant topic reported in
					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
9	25	M.Tech-Software Engineering	2025171201	Software Architecture And Design Patterns	CO1	Classify the architecture ,create it and moving from one to many,
					CO2	Illustrate the architecture and build the system the components
					CO3	Design creational and structural patterns
					CO4	Outline about behavioural pattern and case study in uitlizing the
10	25	M.Tech-Software Engineering	2025171202	Software Quality Assurance And Testing	CO1	Describe various standards used for Software Quality Assurance
					CO2	Explain fundamental concepts in software quality (e.g., internal /
					CO3	Name and describe different testing techniques and approaches
					CO4	Compare various Automation tools used for Software Testing
11	25	M.Tech-Software Engineering	2025171203	Cyber Security	CO1	Explain the fundamentals of Encryption Algorithms
					CO2	Make use of Public Key Cryptographic Algorithms
					CO3	Choose the various Authentication applications of security
					CO4	Demonstrate the functionalities of Firewalls
12	25	M.Tech-Software Engineering	2025171204	Service Oriented Architectures	CO1	Describe the Fundamental concepts of SOA
					CO2	Analyze SOA for Enterprise Solution Assets
					CO3	Design SOA for business Process model
					CO4	Implement SOA for managing SOA Environment
13	25	M.Tech-Software Engineering	2025171205	Secure Software Engineering	CO1	Describe the Properties of Software Secure
					CO2	Verify the effectiveness of a secure software design solution.
					CO3	Analyze the System Complexity for Security Analysis
					CO4	Manage Secure Software for an Enterprise
14	25	M.Tech-Software Engineering	2025171206	Systems Engineering	CO1	Classify Various Management Information Systems
					CO2	Describe Business intelligence and Knowledge management System
					CO3	Identify key organization objectives and processes of an information
					CO4	Analyze the Information System Application like Basic Accounting
15	25	M.Tech-Software Engineering	2025171207	ERP & Supply Chain Management	CO1	Categorize various Online Analytical processing tools
					CO2	Make use of Business modules in ERP Package
					CO3	Analyze different metrics in Supply Chain Management
					CO4	Determine Service Levels in Managing Supply Chains
16	25	M.Tech-Software Engineering	2025171208	E-Commerce	CO1	Understand the basic concepts of E-commerce
					CO2	Demonstrate an retailing in E-commerce by using the effectiveness
					CO3	Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra organizational
					CO4	Describe about Consumer Search and Resource Discovery
17	25	M.Tech-Software	2025171209	User Interface	CO1	Illustrate importance and characteristics of graphical user interface.
					CO2	Analyze human characteristics, human interaction speeds.

17	25	Software Engineering	2025171209	Design	CO3	Apply better screen design techniques.
					CO4	Analyze windows, components and Interaction Devices
18	25	M.Tech-Software Engineering	2025171210	Cloud Computing	CO1	Differentiate among various cloud offerings, cloud environments,
					CO2	Analyze various cloud platforms and cloud applications.
					CO3	Survey the policies and mechanisms for resource management,
					CO4	Choose among different storage technologies for cloud like DFS,
19	25	M.Tech-Software Engineering	2025171211	Software Defined Networks	CO1	Describe the evolution of Software Defined Networks
					CO2	Classify VMware framework for network virtualization
					CO3	Implement Switching and Firewall using SDN
					CO4	Classify Different data center networks
20	25	M.Tech-Software Engineering	2025171212	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
21	25	M.Tech-Software Engineering	2025171221	SE Lab 2	CO1	Perform different testing on given application
					CO2	Build test cases and documentation for various case studies
					CO3	Implement UML design for various Design Patterns
					CO4	Develop Test case Hierarchy
22	25	M.Tech-Software Engineering	2025171232	Technical Seminar2	CO1	Carryout literature survey, and choose a relevant topic reported in
					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 audience.
23	25	M.Tech-Software Engineering	2025171235	Comprehensive Exam	CO1	Analyze a complex computing problem and to apply principles of computing and relevant disciplines to idenitfy solutions
					CO2	Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the
					CO3	Apply computer science theory and software development fundamentals to produce computing-based solutions.
					CO4	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical
24	25	M.Tech-Software Engineering	2025172138	Project Work (Stage- 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
					CO2	Ability to perform individually accepting responsibility, taking
					CO3	Ability to use formal and informal communications with guide,
					CO4	Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems
25	25	M.Tech-Software Engineering	2025172238	Project Work (Stage-II)	CO1	apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements appropriate to chosen topic within the context of legal, societal and environment constraint.
					CO2	Ability to perform individually accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success
					CO3	Ability to use formal and informal communications with guide, make presentations and prepare technical document.
					CO4	Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relavent issues/problems

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A) VISAKHAPATNAM-49

PRINCIPAL
VIGNAN'S INSTITUTE OF
Information Technology (A)
de: VSEZ, Duvvada, Visakh-

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A)

DEPARTMENT OF MASTER OF BUSINESS ADMINISTRATION

VR17- 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	1 E-00	MBA-Master of Business Administration	3099171101	Principles of Mnaagement	CO1	1. Extract Managerial skills of the students
					CO2	2. Identify the external and internal factors that influence on
					CO3	3. Analyze how an organization's leaders/managers utilize job design, positional power, and goal setting/performance
					CO4	4. Discuss leadership characteristics that produce high performing
2	1 E-00	MBA-Master of Business Administration	3099171102	Managerial Economics	CO1	1. Identify the objectives, nature, scope, role & responsibilities of
					CO2	2. Predict the demand for a product or product mix of a company & to analyze various factors influencing demand elasticity.
					CO3	3. Examine optimum production & cost functions with the help of mathematical equations & by developing graphical solutions
					CO4	4. Discuss the concept of equilibrium price and output in different market situations i.e., perfect, monopoly, monopolistic &
3	1 E-00	MBA-Master of Business Administration	3099171103	Accounting For Managers	CO1	1. Identify the types of Accounts and Principles.
					CO2	2. Prepare Financial Statement.
					CO3	3. Analyze the Financial Position of the Organization.
					CO4	4. Evaluate Cost and Cost behaviour.
4	1 E-00	MBA-Master of Business Administration	3099171104	Managerial Communication And Soft Skills	CO1	1. Discuss communication theories.
					CO2	2. Display Verbal and Non-Verbal Communication
					CO3	3. Develop Presentation Skills
					CO4	4. Design Business Report.
5	1 E-00	MBA-Master of Business Administration	3099171105	Business Environment	CO1	1. Interpret business environment and its impact
					CO2	2. Discuss the comprehensive structure of Indian economy
					CO3	3. Debate on various Policies
					CO4	4. Analyze the legal Regulations pertaining to business
6	1 E-00	MBA-Master of Business Administration	3099171106	Quantitative Analysis for Business Decisions	CO1	1. Calculate descriptive statistical measures and appreciate the
					CO2	2. Formulate basic concepts of probability and theoretical probability (binomial, normal but not poisson) distributions.
					CO3	3. To solve a simple ordinary least squares regression model with one explanatory variable, apply the model, and calculate the
					CO4	4. Apply quantitative models (linear programming and network analysis) at an introductory level, with emphasis on relevant data
7	1 E-00	MBA-Master of Business Administration	3099171121	Information Technology Lab	CO1	1. Identify the softwares required for analysis.
					CO2	2. Apply the Financial Modelling Techniques.
					CO3	3. Evaluate data using statistical techniques.
					CO4	Design the presentation using charts.
8	1 E-00	MBA-Master of Business Administration	3099171201	FINANCIAL MANAGEMENT	CO1	1. Identify the sources of Finance.
					CO2	2. Evaluate Profitable Investment Proposals.
					CO3	3. Analyze proportions of Retention and Dividend Payout Ratio.
					CO4	4. Design Credit Policies for Business.
9	1 E-00	MBA-Master of Business Administration	3099171202	Human Resource Management	CO1	1. Identify the roles of HR Manager.
					CO2	2. Interpret current trends and practices in the field of HR
					CO3	3. Evaluate employee performance and organizational
					CO4	4. Design Compensation system for an organization.
10	1 E-00	MBA-Master of Business Administration	3099171203	Marketing Management	CO1	1. Identify core concepts of marketing and the role of marketing in
					CO2	2. Apply the Segmentation, Targeting and Positioning.
					CO3	3. Create an integrated marketing communications plan.
					CO4	4. Analyze marketing problems and implement marketing plans.
11	1 E-00	MBA-Master of Business Administration	3099171204	Production And Operations Management	CO1	1. Identify the core features of the operations and production
					CO2	2. Interpret the various parts of the operations and production
					CO3	3. Develop an integrated framework for strategic thinking and
					CO4	4. Illustrate operational methodologies to assess and improve an
12	1 E-00	MBA-Master of Business Administration	3099171205	Business Research Methodology	CO1	1. Discuss the major types of Research and designs.
					CO2	2. Formulate Research problems and measurements.
					CO3	3. Interpret Research reports.
					CO4	4. Caluculate Business Problems using appropriate methods.
13	1 E-00	MBA-Master of Business Administration	3099171206	ORGANIZATIONAL BEHAVIOUR	CO1	1. Identify the roles and responsibilities of Organizational
					CO2	2. Display Leadership skills in an Organization.
					CO3	3. Analyze behavioural dimensions.
					CO4	4. Apply Interpersonal Communcation skills for Team Building.
14	1 E-00	MBA-Master of Business Administration	3099171231	Mini Projects	CO1	1.Conduct field survey on
					CO2	2.Apply the theortical concept
					CO3	3.Analyze and interpret the data

		Administration			CO4	4.Prepare and present the report
15	1 E-00	MBA-Master of Business Administration	3099172101	STRATEGIC MANAGEMENT	CO1	1. Identify the practical and integrative model of strategic
					CO2	2. Apply the Environmental Scanning Techniques
					CO3	3. Analyze the formulation and structure of Organizational
					CO4	4. Design the Organizational Strategy.
16	1 E-00	MBA-Master of Business Administration	3099172102	LEGAL ASPECTS FOR BUSINESS	CO1	1. Outline the Indian Contract Act.
					CO2	2. Identify the rights of Unpaid Seller.
					CO3	3. Discuss various aspects of Negotiable Instruments and
					CO4	4. Debate on various Cyber Laws.
17	1 E-00	MBA-Master of Business Administration	3099172103	BUSINESS ETHICS CORPORATE GOVERNANCE	CO1	1. Identify the role of Ethical Values of an Organization.
					CO2	2. Debate the global perspective of Unethical practices.
					CO3	3. Discuss the Ethical practices in Functional areas.
					CO4	4. Relate the role of Corporate Governance practices in Indian
18	1 E-00	MBA-Master of Business Administration	3099172133	Case Study	CO1	1.Conduct field survey on
					CO2	2.Apply the theortical concept
					CO3	3.Analyze and interpret the data
					CO4	4.Prepare and present the report
19	1 E-00	MBA-Master of Business Administration	3099172104	PRODUCT MANAGEMENT	CO1	1. Infer the basic concepts of Product.
					CO2	2. Design Development of New Product.
					CO3	3. Build the brand positioning.
					CO4	4. Discuss the Channels of Distribution and Packaging.
20	1 E-00	MBA-Master of Business Administration	3099172105	PROMOTION AND DISTRIBUTION MANAGEMENT	CO1	1. List out the various concepts of Promotion and Distribution.
					CO2	2. Outline the challenges of Distibution System.
					CO3	3. Discuss the various Channels of Distribution.
					CO4	4. Debate the various ethical and social issues in Distribution
21	1 E-00	MBA-Master of Business Administration	3099172106	INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT	CO1	1. Identify different segments of Financial Markets.
					CO2	2. Evaluation of various Asset Valuation Models.
					CO3	3. Apply various Investment Analysis Tools.
					CO4	4. Adopt and apply portfolio evaluation models for the realistic
22	1 E-00	MBA-Master of Business Administration	3099172107	BANKING AND INSURANCE MANAGEMENT	CO1	1. Identify the fundamental concepts of Banking System in India.
					CO2	2. Discuss the various types of Banking Funds.
					CO3	3. Evaluate the latest regulations and innovations in Banking.
					CO4	4. Analyze the LIC and GIC.
23	1 E-00	MBA-Master of Business Administration	3099172108	COMPENSATIO N AND PERFORMANCE MANAGEMENT	CO1	1. Discuss concepts of compensation and designing of effective
					CO2	2. List out various Wage payment systems.
					CO3	3. Evaluate administration of wage and salary.
					CO4	4. Analyze effectiveness of performance management in an
24	1 E-00	MBA-Master of Business Administration	3099172109	MANAGEMENT OF INDUSTRIAL RELATIONS	CO1	1. Identify the essential concepts of industrial relations.
					CO2	2. Discuss the Trade Unions and Work-Life Balance.
					CO3	3. Design the Wage and Salary Administration.
					CO4	4. Interpret and Solve the Grievances in Industries.
25	1 E-00	MBA-Master of Business Administration	3099172201	LOGISTICS AND SUPPLY CHAIN MANAGEMENT	CO1	1. Acquires knowledge of the functional components within logistics to the interrelationships in the integrated supply chain.
					CO2	2. Analyze the difference between logistics and supply chain management & gain knowledge on Benchmarking.
					CO3	3. Evaluate warehousing and transportation options and recommend appropriate solutions for business requiremen
					CO4	4. Make use of technology in logistics and supply chain
26	1 E-00	MBA-Master of Business Administration	3099172202	ENTREPRENEU RSHIP DEVELOPMENT	CO1	1. Discuss Growth and Importance of Entrepreneurship
					CO2	2. Explain the concept of entrepreneurship and Women
					CO3	3. Extract the essence of entrepreneurial motivation
					CO4	4. Elucidate the problems of women entrepreneurship
27	1 E-00	MBA-Master of Business Administration	3099172234	MOOCS	CO1	1.Connect openly on a global scale, with global learners and
					CO2	2.Develop high quality learning using multimedia platform
					CO3	3.Self assesment of their performance and learning process.
					CO4	4.Adapt a life long learning culture and updating the knowledge
28	1 E-00	MBA-Master of Business Administration	3099172204	SERVICES MARKETING	CO1	1. Discuss concepts and components of Services Marketing
					CO2	2. Identify key dimensions of Services Marketing
					CO3	3. Develop service marketing mix strategies
					CO4	4. Evaluate the behavior of the customer and the strategies to
29	1 E-00	MBA-Master of Business Administration	3099172205	CONSUMER BEHAVIOUR	CO1	1. Discuss consumer behavior, models and learning process.
					CO2	2. Analyze consumer attitude formation, change and consumer
					CO3	3. Identify psychological factors affecting consumer behavior and
					CO4	4. Create awareness about consumerism and consumer protection
30	1 E-00	MBA-Master of Business Administration	3099172206	International Financial Management	CO1	1. Demonstrate the understanding of international financial theory
					CO2	2. Illustrate applications pertaining to exchange rate determinants.
					CO3	3. Develop a frame of reference through which to identify, evaluate, and solve problems pertaining to international financial
					CO4	4. Interpret the international taxation methods and management of

31	1 E-00	MBA-Master of Business Administration	3099172207	Financial Risk Management	CO1	1. Discuss risk management concepts in present business situations.
					CO2	2. Evaluate financial risk measurement methods
					CO3	3. Demonstrate financial risk measurement tools
					CO4	4. Apply advanced financial risk management techniques
32	1 E-00	MBA-Master of Business Administration	3099172208	GLOBAL HUMAN RESOURCE MANAGEMENT	CO1	1. Demonstrate across a broad knowledge of HRM strategies, Policies and practices across a range of cultural and nations.
					CO2	2. Differentiate intentional and domestic dimension of the
					CO3	3. Discuss the concepts of expatriation
					CO4	4. To analyze and apply international HRM concepts in relation to global ethical issues in the work place
33	1 E-00	MBA-Master of Business Administration	3099172209	MANAGEMENT OF CHANGE AND DEVELOPMENT	CO1	1. Discuss the relevance of change management approaches and models to a variety of situations where appropriate
					CO2	2. Identify range of skills relevant to the change management
					CO3	3. Articulate management competencies in Organizational
					CO4	4. Apply tools and models to explore underlying organizational and behavioural issues that may affect the change process
34	1 E-00	MBA-Master of Business Administration	3099172238	Major Project & Comprehensive Viva	CO1	1.Conduct field survey on
					CO2	2.Apply the theortical concept
					CO3	3.Analyze and interpret the data
					CO4	4.Prepare and present the report

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY (A) VISAKHAPATNAM-49

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

	VIGNAN'S INSTITUE OF INFORMATION TECHNOLOGY					
	DEPARTMENT OF MCA					
	VR17 - COURSE OUTCOMES					
S. No	Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
1	1F-00	MCA-Master of Computer Application	4010171101	C Programming and Data Structures	CO1	Understand the basic C Programming
					CO2	knowledge on arrays, strings and functions
					CO3	knowledge on pointers, structures and unions
					CO4	summarize recursive methods and compare iterative and
					CO5	Illustrate the usage of various data strucutres and familizrize
					CO6	Slove problems using various data strucutres like linear list,
2	1F-00	MCA-Master of Computer Application	4010171102	Computer Organization	CO1	The basic components of a computer, including CPU, memories, and input/output, and their organization representation of data, addressing modes, instructions sets.
					CO2	Discriminate different register transfer micro operations, Principles of hardwired and micro programmed control
					CO3	Demonstrate various fixed and floating point arithmetic operations, performing the Arithmetic operations of binary number systems and formulating the arithmetic functions and solve scientific problems by means of a numerical analysis method
					CO4	Extrapolate memory organization and input, output organizations
					CO5	Generalize pipe line and vector processing, multi processors and its applications.
3	1F-00	MCA-Master of Computer Application	4010171103	Discrete Mathematical Structures and Graph Theory	CO1	Understanding different counting Techniques
					CO2	Apply different methods to solve homogeneous and non-homogeneous recurrence relations
					CO3	Apply graph theory concepts in core subjects such as data structures and network theory effectively
					CO4	Developing programs in R Language
4	1F-00	MCA-Master of Computer Application	4010171104	Statistical Programming with R	CO1	understand the basic s of R Programming
					CO2	knowledge on R Programming Control statements and functions
					CO3	knowledge on Graphics
					CO4	Awareness on Statistical Concepts
5	1F-00	MCA-Master of Computer Application	4010171105	Accounting and Financial Management	CO1	To learn the concept and the role of accounting.
					CO2	To know the systems of accounting.
					CO3	To understand and the Preparation of trail balance – Final accounts.
					CO4	To understand the concept of financial management.
					CO5	To learn the concept of cost of capital.
					CO6	To understand the capital structure
					CO7	To able to know the cost accounting.
					CO8	To learn the total computerized accounting system.
6	1F-00	MCA-Master of Computer Application	4010171121	English Language Communication Skills Lab	CO1	Use English language fluently, accurately and appropriately.
					CO2	Discuss and discover barriers to effective communication.
					CO3	Demonstrate skills in listening comprehension, GDs and Interview.
					CO4	Read and answer questions (orally and in writing) based on passages.
					CO5	Show effective writing skills in academic and professional contexts.
7	1F-00	MCA-Master of Computer Application	4010171122	C Programming and Data Structures Lab	CO1	Able to write programs in C Language
					CO2	Develop logical and analytical thinking in writing c programs
					CO2	Knowledge in writing programs in various concepts like arrays, functions, pointer etc
					CO3	How to read and write contents from or into a file
8	1F-00	MCA-Master of Computer Application	4010171123	Statistical Programming with R Lab	CO1	Manipulate data within R and to create simple graphs and charts used in introductory
					CO2	Perform and interpret different distribution using R
					CO3	Carry out hypothesis testing and calculate confidence intervals; Perform linear regression models for data analysis
9	1F-00	MCA-Master of	4010171201	OOPS	CO1	Understand the basic Java Programming
					CO2	knowledge on Inheritance, Packages and Interfaces in JAVA

		Application		Through JAVA	CO3	knowledge on Exception Handling, Multi Threading in JAVA
					CO4	Illustrate the concept of event handling mechanism in JAVA
					CO5	Constructs window based application in JAVA
10	1F-00	MCA-Master of Computer Application	4010171202	Operating Systems	CO1	Explain the different types of operating system and its architectures like distributed system, special purpose system
					CO2	Classifying the process management with typical concept of waiting time and turnaround time of different CPU scheduling
					CO3	Classifying the different type of memory management scheme and examine the page faults for different page replacement algorithms and allocation of frames
					CO4	Define the different characterstics of deadlock occurances and correction measure for recovery. Explain the security and privacy issues measurement for the data and system.
					CO5	Describing the file management scheme and its implementation, explaining different type of file organization and allocation method and at last structure of disk scheduling and its structure
11	1F-00	MCA-Master of Computer Application	4010171203	Software Engineering	CO1	The students will know about the various myths that exist in the
					CO2	The meaning of a process and the various process models
					CO3	the various methods of Requirements elicitation, prioritization, specification and validation of requirements
					CO4	The meaning of architecture and various architectural styles
					CO5	The principles and guidelines for good coding
					CO6	The testing process, various testing strategies and testing techniques
12	1F-00	MCA-Master of Computer Application	4010171204	Operations Research for Computer Applications	CO1	Understanding different counting Techniques
					CO2	Apply different methods to solve homogeneous and non-homogeneous recurrence relations
					CO3	Apply graph theory concepts in core subjects such as data
					CO4	Analyse logical structure and able to apply inference theory to verify the consistence of data
13	1F-00	MCA-Master of Computer Application	4010171205	Computer Graphics	CO1	understand the basic s of Computer Graphics
					CO2	knowledge on simulators,2D,3D,Animation
					CO3	knowledge on object representation, line, circle Design
					CO4	Awareness on programs of computer graphics
14	1F-00	MCA-Master of Computer Application	4010171221	OOPS Through JAVA Lab	CO1	Able to write programs in Java Language
					CO2	Develop logical and analytical thinking in programming concepts.
					CO3	Knowledge in writing programs in various concepts like
15	1F-00	MCA-Master of Computer Application	4010171222	Web Technologies Lab	CO1	successfully design and implement a web site.
					CO2	Demonstrate the ability to analyze, identify and define the technology required to build and implement a web site
					CO3	used in the creation of a web site.
					CO4	Utilize and apply the technical, ethical and interpersonal skills needed to function in a cooperative environment.
16	1F-00	MCA-Master of Computer Application	4010171223	Operating System & Computer Graphics Lab	CO1	Analyze the structure and basic architectural components
					CO2	Understand and analyse theory and implementation of different operating system aspect
					CO3	Design and apply two dimensional graphics and
					CO4	Design and apply three dimensional graphics and transformations.
17	1F-00	MCA-Master of Computer Application	4010172301	Database Management Systems	CO1	Student can able to describe the Architecture of Database
					CO2	Student can design different ER Models
					CO3	Student can able to differentiate the knowledge in TRC & DRC
					CO4	Student can compare relational model with the structured query
					CO5	Student can able to design the new database
					CO6	Student can perform transactions for new concepts
					CO7	Student can differentiate different indexing techniques in real time
18	4E+09	MCA-Master of Computer Application	4010172302	Advanced JAVA Programming	CO1	Students are able to develop a dynamic webpage by the use of
					CO2	Students will be able to connect a java program to a DBMS and perform insert, update and delete operations on DBMS table.
					CO3	Students will be able to write a server side java application called Servlet to catch form data sent from client, process it and store it on database.

		Application		Programming	CO4	Students will be able to write a server side java application called JSP to catch form data sent from client and store it on database
					CO5	Students are able to develop a dynamic webpage by the use of java script and DHTML.
19	4E+09	MCA-Master of Computer Application	4010172303	UNIX Programming	CO1	Ability to understand and reason out the working of Unix
					CO2	To teach students the use of basic UNIX Utilities
					CO3	To teach students the principles of UNIX shell programming
					CO4	To familiarize students with the concepts, design, and structure of the UNIX operating system
					CO5	To be able to build an application / service over a UNIX system
20	1F-00	MCA-Master of Computer Application	4010172304	Management Information System	CO1	The students will know to Define information technology and
					CO2	The students will know to Identify the different types of Information systems
					CO3	Describe the evolution of MIS
					CO4	To Recognize the importance of having a disaster recovery plan
					CO5	Understand the role of Computer Aided Decision System in business environment
					CO6	To Measure the threat of virus and identify ways of preventing them
21	1F-00	MCA-Master of Computer Application	4010172305	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
22	1F-00	MCA-Master of Computer Application	4010172321	Database Management Systems Lab	CO1	Have a good understanding of how several fundamental algorithms work, particularly those concerned with creation and
					CO2	have a good understanding of the fundamental DBMS used in computer science
					CO3	be able to understand various queries and their execution.
					CO4	be able to design new database and modify existing ones for new applications and reason about the efficiency of the result
23	1F-00	MCA-Master of Computer Application	4010172322	UNIX Programming Lab	CO1	You will be able to run various UNIX commands on a standard
					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
24	1F-00	MCA-Master of Computer Application	4010172323	Advanced JAVA Programming Lab	CO1	Create and Mange static web pages for given scenario
					CO2	Apply server side technologies to establish dynamic applications
					CO3	Implement web applications with effective data management
					CO4	Develop secure web applications with session management API's
25	1F-00	MCA-Master of Computer Application	4010172401	Object Oriented Analysis and Design	CO1	Possess an ability to practically apply knowledge software engineering methods, such as object-oriented analysis and
					CO2	Have a working ability and grasping attitude to design and conduct object-oriented analysis and design experiments using UML, as well as to analyze and evaluate their Models.
					CO3	Have a capacity to analyze and design software systems, components to meet desired needs
					CO4	Display an ability to identify, formulate and solve software development problems: software requirements, specification (problem space), Software design, and implementation (solution space).
					CO5	Show an ability to use the graphical UML representation using tools, such as IBM's Rational Rose or Microsoft's Vision.
26	1F-00	MCA-Master of Computer Application	4010172402	Computer Networks	CO1	Students will learn the basics of networks and its topological
					CO2	students will learn diffeent type of error detection and control for data link layer protocol and understanding the differerent type of routing algoritm
27	1F-00	MCA-Master of Computer Application	4010172403	Data warehousing and Mining	CO1	Student will able to know various types of data and how to
					CO2	Students will have the knowledge of different structure of Web
28	1F-00	MCA-Master of Computer Application	4010172404	Mobile Computing	CO1	classify the functionality of every individual layer. Classifying the different type of Adhoc topology and transmission of controlling the data on every layer

29	1F-00	MCA-Master of Computer Application	4010172405	Human Computer Interaction	CO1	Apply the basics of human and computational abilities and limitations
					CO2	Apply new theories, tools and techniques in HCI.
					CO3	Have a capacity to analyze and design software systems, components to meet desired needs.
					CO4	Apply the fundamental aspects of designing and evaluating interfaces.
					CO5	Practice a variety of simple methods for evaluating the quality of a user interface
					CO6	Apply appropriate HCI techniques to design systems that are usable by people.
30	1F-00	MCA-Master of Computer	4010172406	Cloud Computing	CO1	Evaluate the different view of virtual servers and its computing collaboration with different applications with virtual work
31	1F-00	MCA-Master of Computer Application	4010172407	Software Project Management	CO1	Understand the fundamental principles of Software Project
					CO2	You will have good knowledge of the issues and challenges faced while doing the Software project Management and be familiar with the different methods and techniques used for project management
					CO3	Will be able to do the Project Scheduling, tracking, Risk
32	1F-00	MCA-Master of Computer Application	4010172408	Artificial Intelligence	CO1	Identify problems that are amenable to solution of AI methods, and which AI methods may be suited to solving a given problem.
					CO2	Formalize a given problem in the language/framework of different AI methods
					CO3	Implement basic AI algorithms
33	1F-00	MCA-Master of Computer Application	4010172409	Embeded Systems	CO1	Exploration and analysis of various types of timers and
					CO2	Student will able to do deep discussion about message queues, mailboxes, and pipes. Describe the process of effective memory management
34	1F-00	MCA-Master of Computer Application	4010172421	Soft Skills Lab	CO1	The learner will be able to maintain work life balance and will become professionally and ethically sound in overcoming stress.
					CO2	The learner will be able to maintain interpersonal relationships by managing emotional intelligence.
					CO3	The learner will be able to acquire employability and problem solving skills.
35	1F-00	MCA-Master of Computer Application	4010172422	Data Warehousing and Mining Lab	CO1	To understand the basic principles, concepts and applications of data warehousing and data mining.
					CO2	Ability to do Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment.
					CO3	Have a good knowledge of the fundamental concepts that
36	1F-00	MCA-Master of Computer Application	4010172423	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
37	1F-00	MCA-Master of Computer Application	4010172431	Mini Project	CO1	Understand the Case studies and design the Model.
					CO2	Understand how design patterns solve design problems.
					CO3	Develop design solutions using creational patterns.
					CO4	Construct design solutions by using structural and behavioral patterns
38	1F-00	MCA-Master of Computer Application	4010173501	Big Data Analytics	CO1	Understand the concepts of Big data and challenges in processing Big Data
					CO2	Understand Hadoop architecture and eco-system.
					CO3	Gain conceptual understanding of Hadoop Distributed File System.
					CO4	Understand the concepts of map and reduce and functional programming
					CO5	Identify appropriate techniques and tools to solve actual Big Data problems.
39	1F-00	MCA-Master of Computer Application	4010173502	Network Programming	CO1	Ability to understand and reason out the working of network
					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
					CO5	To be able to build an application of UNIX programming in socket.
40	1F-00	MCA-Master of Computer	4010173503	Python	CO1	Construct Software easily right out of the box
					CO2	Experiment with an interpreted Language

		Application		Programming	CO3	Build software for real needs
					CO4	Explain to testing Orielly
41	1F-00	MCA-Master of Computer Application	4010173504	Cyber Security	CO1	Explore various security policies and evolution of security.
					CO2	Investigate more on various catalog approaches and cyber security objectives.
					CO3	Analyze cyber user and conflict issues.
					CO4	Review cyber management and infrastructure issues.
					CO5	Examine various case studies on cyber security policies.
42	1F-00	MCA-Master of Computer Application	4010173505	Computer Forensics	CO1	Explain the role of forensics in preventing various forms of
					CO2	Develop skills in distinguishing various types of computer crimes and identify the digital fingerprints associated with criminal activities.
					CO3	Illustrate how to apply different forensic analysis tools to recover important evidence for identifying computer crimes.
					CO4	Explain about threats and compare various threats.
					CO5	Summarize the need for surveillance and list the tools used.
43	1F-00	MCA-Master of Computer Application	4010173506	E-Commerce	CO1	Gain an understanding of the theories and concepts underlying e commerce.
					CO2	Apply e-commerce theory and concepts to what e-marketers are doing in "the real world"
					CO3	Review e-Commerce infrastructures including architecture models, security & payment systems.
					CO4	Improve familiarity with current challenges and issues in e-commerce.
					CO5	Identify business models surrounding e-Commerce including marketing strategies
44	1F-00	MCA-Master of Computer Application	4010173507	Internet of Things	CO1	Demonstrate knowledge and understanding of the security and ethical issues of the Internet of Things
					CO2	Conceptually identify vulnerabilities ,including recent attacks ,involving the Internet of Things
					CO3	Develop critical thinking skills
					CO4	Compare and contrast the threat environment based on Industry or device type.
45	1F-00	MCA-Master of Computer Application	4010173508	Multimedia Application Development	CO1	Developed understanding of technical aspect of Multimedia
					CO2	Understand various file formats for audio, video and text media.
					CO3	Develop various Multimedia Systems applicable in real time.
					CO4	Design interactive multimedia software.
					CO5	Apply various networking protocols for multimedia applications.
46	1F-00	MCA-Master of Computer Application	4010173509	Software Testing Methodologies	CO1	Analyze the Conventional Software Management and
					CO2	Demonstrate the principles of conventional software Engineering, Life cycle Phases, and Artifacts of the process.
					CO3	Apply the Software testing Work Flows of the process, Checkpoints of the process and Iterative Process Planning.
					CO4	Develop automation Process, Project Control and Process instrumentation, tailoring the process in software testing.
					CO5	Evaluate the project organizations and responsibilities, future software project management with case study
47	1F-00	MCA-Master of Computer Application	4010173521	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	4010173522	Network Programming Lab	CO1	Write shell script for basic network problems
					CO2	Write shell script for functions
					CO3	Develop shell script for file handling problems.
					CO4	Develop solutions for real time problems
49	1F-00	MCA-Master of Computer Application	4010173523	Python Programming Lab	CO1	Learn how to install Python Software
					CO2	Learn the flow control and arrays
					CO3	Identify data strucutre for the given problem
					CO4	Develop solutions for basic problems in Python
					CO1	Identify and understand assumptions, theses, and arguments that exist in the work of authors.

50	1F-00	MCA-Master of Computer Application	4010173632	Technical Seminar	CO2	Extend intellectual discovery and unravel complexities of thought.
					CO3	Evaluate initial hypotheses in light of evidence and collaborative discussion with the goal of making considered judgments.
					CO4	Improve reflective listening and inclusive, respectful conversation
51	1F-00	MCA-Master of Computer Application	4010173637	Internship	CO1	Apply domain knowledge during the course of internship
					CO2	Develop/implement the solutions with appropriate techniques, resources and contemporary tools.
					CO3	Work independently and in a collaboration in multidisciplinary environment and to allocate time effectively and manage to complete the work allotted within stipulated time.
					CO4	Exhibit integrity and ethical behavior while carrying out the internship and for the preparation of internship report and to demonstrate effective oral and written communication skills
52	1F-00	MCA-Master of Computer Application	4010173638	Project	CO1	Analyze a complex computing problem and to apply software engineer principles in design and investigation of optimized solutions.
					CO2	Investigate and develop computing-based solution using mordern tools that help in sustaining environment and society.
					CO3	Use formal and informal discussions with team members and guide, make presentations and prepare technical document.
					CO4	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

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

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY(A)							
B.TECH. MECHANICAL ENGINEERING							
	COURSE OUTCOMES						
S.No	Regulation	Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
1	VR17	03	B.Tech-Mechanical Engineering	1000171101	English- I	CO1	Enhance English Language by relating the ideas of eminent personalities.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Articulate the technological advancements fluently.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Inculcate the art of thinking and writing clearly and logically.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Enact various themes through team work and learn the usage of vocabulary through humourous texts.
2	VR17	03	B.Tech-Mechanical Engineering	1000171102	Engineering Mathematics-I	CO1	Solve the first and higher order linear differential equations.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Estimate extrema and series expansions of functions of several variables.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Interpret area and volume using double integral and triple integral.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Evaluate of solution of Ordinary differential equations by using Laplace Transform technique.
3	VR17	03	B.Tech-Mechanical Engineering	1000171104	Engineering Chemistry	CO1	Categorize various types of polymeric materials, fuels, lubricants, refractories and establish their applications.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Analyse hardness of water and describe various softening methods
	VR17	03	B.Tech-Mechanical Engineering			CO3	Illustrate the principles of green chemistry, corrosion and its prevention and demonstrate the construction and working of batteries
	VR17	03	B.Tech-Mechanical Engineering			CO4	Emphasize on various engineering materials like nano materials, solar cells and their applications.
4	VR17	03	B.Tech-Mechanical Engineering	1000171105	Computer Programming using C	CO1	Choose algorithmic solutions for a given problem and Implementing basic programs in C.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply decision making and Iterative feature of C Programming language effectively.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Design &Develop of recursive and non recursive function & their usage to build large modular programs.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Select problem specific data structure using suitable accessing methods.
5	VR17	03	B.Tech-Mechanical Engineering	1000171112	Environmental Studies	CO1	Elucidate the natural resource & their importance for the sustenance of life and recognises the need to conserve natural resource
	VR17	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
	VR17	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
	VR17	03	B.Tech-Mechanical Engineering			CO4	Educates about Environmental Impact Assessment, Environmental Impact Statement & Environmental Audit
6	VR17	03	B.Tech-Mechanical Engineering	1000171116	Engineering Mechanics	CO1	Analyze the force systems for equilibrium conditions and able to draw free body diagram.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Evaluate the frictional forces between contact surfaces.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Differentiate between centroid and centre of gravity. Determine the centroid, centre of gravity and second moment of area for composite sections.

	VR17	03	B.Tech-Mechanical Engineering			CO4	Analyze the motion and calculate trajectory characteristics.
7	VR17	03	B.Tech-Mechanical Engineering	1000171121	English - Communication Skills Laboratory-I	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	03	B.Tech-Mechanical Engineering			CO2	Articulate with others by using proper functions.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Enact the roles with proper body language.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Communicate fluently with proper pronunciation
8	VR17	03	B.Tech-Mechanical Engineering	1000171127	Engineering Chemistry Laboratory	CO1	Categorize various types of polymeric materials, fuels, lubricants, refractories and establish their applications.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Analyze hardness of water and describe various softening methods
	VR17	03	B.Tech-Mechanical Engineering			CO3	Illustrate the principles of green chemistry, corrosion and its prevention and demonstrate the construction and working of batteries
	VR17	03	B.Tech-Mechanical Engineering			CO4	Emphasize on various engineering materials like nanomaterials, solar cells and their applications.
9	VR17	03	B.Tech-Mechanical Engineering	1000171128	Computer Programming Laboratory	CO1	Demonstrate and trace the execution of programs written in C language.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Build C code for a given basic algorithms
	VR17	03	B.Tech-Mechanical Engineering			CO3	Develop Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor
	VR17	03	B.Tech-Mechanical Engineering			CO4	Solve File handling problems
10	VR17	03	B.Tech-Mechanical Engineering	1000171201	English- II	CO1	Develop communication skills by inferring the technological advancements.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Identify the life of eminent personalities.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Relate the importance of Environment and its sustainability to language learning
	VR17	03	B.Tech-Mechanical Engineering			CO4	Create the art of writing by applying apt vocabulary and grammar.
11	VR17	03	B.Tech-Mechanical Engineering	1000171202	Engineering Mathematics-II	CO1	Estimate numerical solution of non Linear equation.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Construct Interpolating polynomial for the given data.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Calculate Numerical Solution of ODE and Numerical Integration.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Evaluate Fourier series and Fourier transforms for functions.
12	VR17	03	B.Tech-Mechanical Engineering	1000171203	Engineering Mathematics-III	CO1	Solve simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Identify and solve partial differential equations.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Calculate gradient of a scalar function, divergence and curl of a vector function.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Evaluate line, surface and volume integrals using appropriate integral theorems.
13	VR17	03	B.Tech-Mechanical Engineering	1000171204	Engineering Physics	CO1	Describe the wave phenomena of light and working principle of optical instruments.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply the basic knowledge of acoustics and ultrasonics for the understanding of acoustics design and non-destructive testing.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Understanding the fundamental concepts of nuclear reactions for working of nuclear reactors.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Discuss the structural, magnetic and electrical properties of materials.
	VR17	03	B.Tech-Mechanical Engineering			CO1	Able to analyse the various electrical networks.

14	VR17	03	B.Tech-Mechanical Engineering	1000171205	Basic Electrical and Electronics Engineering	CO2	Able to understand the operation of DC generators,3-point starter and conduct the Swinburne's Test.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Able to analyse the performance of transformer.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Able to explain the operation of 3-phase alternator and 3-phase induction motors.
15	VR17	03	B.Tech-Mechanical Engineering	1000171206	Engineering Drawing	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR17	03	B.Tech-Mechanical Engineering			CO2	Learn the principle of orthographic projections. Draw Orthographic projections of points, lines.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Draw the various types of planes and solids its views in different Positions
	VR17	03	B.Tech-Mechanical Engineering			CO4	Draw isometric views of simple objects
16	VR17	03	B.Tech-Mechanical Engineering	1000171221	English Communication Skills Lab-2	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	03	B.Tech-Mechanical Engineering			CO2	Articulate with others by using proper functions.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Enact the roles with proper body language.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Communicate fluently with proper pronunciation
17	VR17	03	B.Tech-Mechanical Engineering	1000171222	Engineering Physics Laboratory	CO1	Experimentation of laws of vibrations in stretched string
	VR17	03	B.Tech-Mechanical Engineering			CO2	Determination of velocity of sound, rigidity modulus of a wire, acceleration due to gravity, radius of gyration and Planck's constant.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Analyse the voltage vs. current characteristics of Zener diode and temperature vs. resistance characteristics of a thermistor
	VR17	03	B.Tech-Mechanical Engineering			CO4	Demonstration of formation Newton's rings, diffraction pattern using grating and induced magnetic field in a circular coil.
18	VR17	03	B.Tech-Mechanical Engineering	1000171224	Engineering Workshop	CO1	Understand different operations: Fitting, smithy, carpentry and Electrical wiring.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Perform the fitting and carpentry operations.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Develop simple objects like funnel, elbow etc. using sheet metal.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Apply basic electrical engineering knowledge for house wiring practice like stair case wiring, series and parallel connections
19	VR17	03	B.Tech-Mechanical Engineering	1003172101	Metallurgy & Materials Science	CO1	Construct various equilibrium diagrams in metals and alloys and understand metallographic structure influences the mechanical properties
	VR17	03	B.Tech-Mechanical Engineering			CO2	Differentiate various class of materials based on the applications.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Estimate the mechanical integrity and failure in materials.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Prepare the new combinations of alloys, composites and nano-materials suitable for specific purposes.
20	VR17	03	B.Tech-Mechanical Engineering	1003172102	Mechanics of Solids	CO1	Understand various stresses and strains in structural members under several loading conditions.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Evaluate the shear force, bending moment, deflection of beams, and torsional stresses for different loading and support conditions.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Analyze the behaviour of different beams and columns for different loading and support conditions to assess societal issues

	VR17	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.
21	VR17	03	B.Tech-Mechanical Engineering	1003172103	Thermodynamics	CO1	Understand the laws of thermodynamics.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply the laws of thermodynamics to various engineering systems
	VR17	03	B.Tech-Mechanical Engineering			CO3	Understand the psychrometric properties
	VR17	03	B.Tech-Mechanical Engineering			CO4	Analyze working of power cycle and their performance.
22	VR17	03	B.Tech-Mechanical Engineering	1003172104	Fluid Mechanics & Hydraulic Machines	CO1	Explain the basics of fluid statics and dynamics
	VR17	03	B.Tech-Mechanical Engineering			CO2	Analyze the flow behaviour of fluid using Bernoullis equation
	VR17	03	B.Tech-Mechanical Engineering			CO3	Apply the concept of boundary layer theory to internal and external flows
	VR17	03	B.Tech-Mechanical Engineering			CO4	Evaluate and analyze performance characteristics of hydraulic turbines and pumps
23	VR17	03	B.Tech-Mechanical Engineering	1003172105	Computer Aided Machine Drawing	CO1	Draw simple machine elements including screw threads, bolts, nuts, keys.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Drafting of cotter joints, riveted joints and bearings for societal applications.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Generate an assembly drawings as well as to analyze and interpret assemblies of various engine parts, machine parts from part drawings.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Design and model various machine components assemblies.
24	VR17	03	B.Tech-Mechanical Engineering	1099172106	Managerial Economics &FinancialAnalysis	CO1	Describe the economic activities performed by the businessmen in the business for profit earning.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Analyze and implement operations on linked lists and demonstrate their applications.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Implement stacks and queues using arrays and linked lists.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Prepare financial statements and understand and implement the capital budgeting tools and techniques.
25	VR17	03	B.Tech-Mechanical Engineering	1003172121	Fluid Mechanics & Hydraulic Machinery Lab	CO1	Calibrate flow measuring devices such as venturimeter, orifice meter
	VR17	03	B.Tech-Mechanical Engineering			CO2	Evaluate the major and minor losses in flow through pipes.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Determine the force exerted by a jet of fluid on vanes of different shapes by experimentation and further compare with theoretical values.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Analyse the performance characteristics of turbines and pumps.
26	VR17	03	B.Tech-Mechanical Engineering	1003172122	Mechanics of Solids & Metallurgy Lab	CO1	Understand the behavior of different materials under tensile and shear loads
	VR17	03	B.Tech-Mechanical Engineering			CO2	Determine the toughness and hardness of different materials by experimentation.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Estimate the elastic constants by torsion test and deflection test on beams.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Characterize the microstructures of different ferrous and non ferrous metals.
27	VR17	03	B.Tech-Mechanical Engineering	1003172201	Kinematics of Machinery	CO1	Perform kinematic analysis of various mechanisms.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Describe different types of mechanisms based on type of pairs.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Analyze the different mechanism and its motion transmission.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Apply different mechanisms in real time applications.
28	VR17	03	B.Tech-Mechanical Engineering	1003172202	Thermal	CO1	Understand the working of internal combustion engines and compressors.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Describe the combustion phenomenon in SI and CI engines.

28	VR17	03	B.Tech-Mechanical Engineering	1003172202	Engineering – I	CO3	Determine the performance of IC engines.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Analyze and solve the problems on reciprocating and rotary compressor.
29	VR17	03	B.Tech-Mechanical Engineering	1003172203	Manufacturing Technology -I	CO1	Understand the casting, welding, sheet metal and powder metallurgy processess.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Choose suitable fusion and solid state welding process for specific application.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Estimate the force requirements for various bulk and sheet metal forming operations.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Classify the various powder metallurgy process and processing of plastics
30	VR17	03	B.Tech-Mechanical Engineering	1003172204	Design of Machine Members -I	CO1	Describe the different types stresses under static and fluctuating loading condition.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply the knowledge of simple and variable stresses in the design of fasteners like riveted, welded and bolted joints.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Design the various cotter joints, knuckle joint and shaft couplings.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Estimate the force requirements for various bulk and sheet metal forming operations.
31	VR17	03	B.Tech-Mechanical Engineering	1003172205	Instrumentation & Control Systems	CO1	Understand the working principle of different measuring instruments.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Classify the various instruments to measure pressure, level, flow and speed
	VR17	03	B.Tech-Mechanical Engineering			CO3	Describe the importance of measurement of stress, strain, force, torque, power and humidity
	VR17	03	B.Tech-Mechanical Engineering			CO4	Explain various types of control systems and servomechanisms to measure temperature, speed and position.
32	VR17	03	B.Tech-Mechanical Engineering	1003172206	Industrial Engineering and Management	CO1	Understand the concepts of scientific management and modern management theories
	VR17	03	B.Tech-Mechanical Engineering			CO2	Choose the plant location and design a plant layout for a specific industry
	VR17	03	B.Tech-Mechanical Engineering			CO3	Describe the statistical quality control technique in a manufacturing industry.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Estimate the project completion time using PERT and CPM techniques
33	VR17	03	B.Tech-Mechanical Engineering	1003172221	Production Technology Lab	CO1	Build sand mould for different patterns in casting process
	VR17	03	B.Tech-Mechanical Engineering			CO2	Measure the properties of moulding sand to check its suitability.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Prepare weld joints using manual arc welding process.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Develope various components by mechanical forming processes
34	VR17	03	B.Tech-Mechanical Engineering	1003172222	Electrical & Electronics Engineering Lab	CO1	Predict the performance characteristics of DC machines and induction motor
	VR17	03	B.Tech-Mechanical Engineering			CO2	Predict the regulation of single phase transformer & alternator.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Perform experimentation on rectifiers and evaluate their characteristics.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Investigate variuos industries in and around the student's institute
35	VR17	03	B.Tech-Mechanical Engineering	1003172231	Industrial Visit	CO1	Understand the various production processes going in the industries with societal machines.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Relate the process of getting the relationships with the technical people ethically.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Define the courses handled in course of study.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Applythe knowledge of study in industrial applications.

36	VR17	03	B.Tech-Mechanical Engineering	1003173101	Dynamics of Machinery	CO1	Analyze the stabilization of sea vehicles, aircrafts and automobile vehicles using gyroscopic principles.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Define the torque and effect of friction in mechanical systems.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Evaluate the dynamic forces acting on the flywheels and governors.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Measure the balancing of rotary and reciprocating masses using analytical and graphical methods.
37	VR17	03	B.Tech-Mechanical Engineering	1003173102	Manufacturing technology -II	CO1	Understand the metal cutting mechanisms and different machining processes.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Choose the suitable cutting tool material for various machining operations.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Distinguish the various type of machining process for specific geometry of the final component.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Define the importance of CNC machines and additive manufacturing processes for inductrial needs.
38	VR17	03	B.Tech-Mechanical Engineering	1003173103	Design of Machine Members – II	CO1	Design different types of bearings and various I.C engine parts like Piston, Connecting rod, Crank shaft and Cylinder.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Calculate the stresses in curved beams and design power screws like screw jack, differential and compounds screws.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Design various power transmission elements such as belts, ropes, chains, pulleys and machine tool elements of levers.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Choose the suitable gear drives for different applications.
39	VR17	03	B.Tech-Mechanical Engineering	1003173104	Thermal Engineering – II	CO1	Understand the basic working principle and operation of all components in a steam power plant.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Evaluate the performance of all components employed in steam power plant.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Mesure the performance of impulse and reaction turbines .
	VR17	03	B.Tech-Mechanical Engineering			CO4	Apply the principle of Newton laws to Jet and rocket Propulsion systems.
40	VR17	03	B.Tech-Mechanical Engineering	1003173105	Metrology	CO1	Understand the limits and fits for product quality of interchangeability and selective assembly
	VR17	03	B.Tech-Mechanical Engineering			CO2	Choose appropriate method for linear and angular measuerements including optical instruments
	VR17	03	B.Tech-Mechanical Engineering			CO3	Asses the surface roughness and inspect the various parts with comparators
	VR17	03	B.Tech-Mechanical Engineering			CO4	Choose the appropriate method and instruments for inspection of various gear and thread elements and also evaluate the machine tool alignement
41	VR17	03	B.Tech-Mechanical Engineering	1003173121	Kinematics & Dynamics Lab	CO1	Understand the motion of a motorized gyroscope when the couple is applied along its spin axis
	VR17	03	B.Tech-Mechanical Engineering			CO2	Mesure the whirling speed of shaft theoretically and experimentally
	VR17	03	B.Tech-Mechanical Engineering			CO3	Analyse simple and compound screw jack and determine the mechanical advantage, velocity ratio and efficiency
	VR17	03	B.Tech-Mechanical Engineering			CO4	Draw the characteristic curves for the radius of rotation and speed of the governors
42	VR17	03	B.Tech-Mechanical Engineering	1003173122	Thermal Engineering Lab	CO1	Construct Valve and Port Timing plot in I C Engines
	VR17	03	B.Tech-Mechanical Engineering			CO2	Evaluate the Performance the on 4/2 stroke CI/SI engines experimentally
	VR17	03	B.Tech-Mechanical Engineering			CO3	Analyze a heat balance sheet and estimate various heat losses in engines.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Apply preventive maintenance to the I C Engines
43	VR17	03	B.Tech-Mechanical Engineering	1003173123	Instrumentation and Metrology	CO1	Define the measuring and gauging instruments for inspection of precision linear, geometric forms, angular and surface finish measurements
	VR17	03	B.Tech-Mechanical Engineering			CO2	Analyse the calibration of instruments

43	VR17	03	B.Tech-Mechanical Engineering	1005173123	and Metrology Lab	CO3	Measure the alignment errors on machine tools using alignment tests.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Calibration of various instruments for measuring pressure, temperature, displacement, speed, vibration etc.
44	VR17	03	B.Tech-Mechanical Engineering	1099173101	IPR & Patents	CO1	Relate Ethical Human Values
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply Engineering knowledge for societal benefits
	VR17	03	B.Tech-Mechanical Engineering			CO3	Demonstrate responsibility for Safety, Risk & rights
	VR17	03	B.Tech-Mechanical Engineering			CO4	Outline the various Current Global Issues
45	VR17	03	B.Tech-Mechanical Engineering	1003173201	Finite Element Methods	CO1	Understand the concepts of variational methods and weighted residual methods.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Identify the suitable FEA elements such as bars, beams, plane and isoparametric elements to create Finite Element Model with respect to the application
	VR17	03	B.Tech-Mechanical Engineering			CO3	Apply suitable boundary conditions to the finite element model and solve the equations.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Identify how the finite element method expands beyond the structural domain, for problems involving dynamics, heat transfer.
46	VR17	03	B.Tech-Mechanical Engineering	1003173202	Heat Transfer	CO1	Understand the various modes of heat transfer.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Evaluate heat transfer coefficients for natural convection and forced convection .
	VR17	03	B.Tech-Mechanical Engineering			CO3	Design and develop a heat exchanger.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Estimate the radiation emited by balck body and gray body.
47	VR17	03	B.Tech-Mechanical Engineering	1003173203	Robotics	CO1	Identify various robot configuration and components.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Select appropriate actuators and sensors for a robot based on specific application.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Analyze kinematic and dynamic analysis for simple serial kinematic chains.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Define trajectory planning for a manipulator by avoiding obstacles.
48	VR17	03	B.Tech-Mechanical Engineering	1003173204	Operations Research	CO1	Develop the different linear programming and assignment models for domain specific situations.Develop the different linear programming and assignment models for domain
	VR17	03	B.Tech-Mechanical Engineering			CO2	Analyze the different transportation models.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Design inventory and queueing theory models for optimal decisions.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Apply optimal strategy to real time applications using dynamic programming and game theory.
49	VR17	03	B.Tech-Mechanical Engineering	1005173206	INTRODUCTION TO DATA BASE MANAGEMENT SYSTEMS	CO1	Describe ER model and normalization for database design.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Create, maintain and manipulate a relational database using SQL
	VR17	03	B.Tech-Mechanical Engineering			CO3	Design and build database system for a given real world problem
	VR17	03	B.Tech-Mechanical Engineering			CO4	Examine issues in data storage and query processing and can formulate appropriate solutions.
50	VR17	03	B.Tech-Mechanical Engineering	1005173207	INTRODUCTION TO PYTHON PROGRAMMING	CO1	Install Python IDE and run basic Python scripts.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Understand the operators, functions, key Concepts of Object Oriented Programming in python.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Access Python from various online resources and import packages to the current working environment.

	VR17	03	B.Tech-Mechanical Engineering			CO4	Develop front end GUI using Visualization Libraries and Multithreading techniques.
51	VR17	03	B.Tech-Mechanical Engineering	1001173207	WASTE WATER MANAGEMENT	CO1	Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Impart knowledge on selection of treatment methods for industrial wastewater.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Describe the common methods of treatment in different industries
	VR17	03	B.Tech-Mechanical Engineering			CO4	Explain operational problems of common effluent treatment plant and the manufacturing process of various industries.
52	VR17	03	B.Tech-Mechanical Engineering	1099173201	ENTREPRENEURSHIP DEVELOPMENT	CO1	Understanding the Entrepreneurship.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Define the business Environment.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Exposure on Industrial Policies.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Impart the plan preparation and Launching of small business, management.
53	VR17	03	B.Tech-Mechanical Engineering	1003173291	CBCS (MOOCS)	CO1	Learn from peers around the world
	VR17	03	B.Tech-Mechanical Engineering			CO2	Choose job applications and career prospects
	VR17	03	B.Tech-Mechanical Engineering			CO3	Organize their participation according to learning goals
	VR17	03	B.Tech-Mechanical Engineering			CO4	Create new space for experimentation
54	VR17	03	B.Tech-Mechanical Engineering	1099172103	PROFESSIONAL ETHICS AND HUMAN VALUES	CO1	Understanding basic purpose of profession, professional ethics and various moral and social issues
	VR17	03	B.Tech-Mechanical Engineering			CO2	Define the various roles of Engineer in applying ethical principles at various professional levels
	VR17	03	B.Tech-Mechanical Engineering			CO3	Express professional rights and responsibilities of an Engineer, safety and risk benefit analysis of an Engineer
	VR17	03	B.Tech-Mechanical Engineering			CO4	Relate thecompetitive and challenging environment to contribute to industrial growth
55	VR17	03	B.Tech-Mechanical Engineering	1003173221	Machine Tools and Metal Cutting Lab	CO1	Identify the various parts of Machine Tools
	VR17	03	B.Tech-Mechanical Engineering			CO2	Understand various machining operations on the lathe machine.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Define various cutting operations on shaping, planing and slotting, drilling, milling and grinding machines
	VR17	03	B.Tech-Mechanical Engineering			CO4	Choose suitable machine, based on the geometry of final component
56	VR17	03	B.Tech-Mechanical Engineering	1003173222	Heat Transfer Lab	CO1	Determine thermal conductivity of various materials experimentally .
	VR17	03	B.Tech-Mechanical Engineering			CO2	Conduct investigation of heat flow when metal rod placed at different angles by free convection and forced convection
	VR17	03	B.Tech-Mechanical Engineering			CO3	Evaluate the effectiveness of heat exchangers experimentally.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Evalaute the various parameters related to radiative heat transfer experimentally.
57	VR17	03	B.Tech-Mechanical Engineering	1003173223	CAE Lab (FEA+CFD)	CO1	Understand various analytical tools for Engineering Simulation.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Evaluate thermal properties in conductive heat transfer mode.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Evaluate thermal properties in Convective and radiative heat transfer mode.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Analtze the stress of various parts.

58	VR17	03	B.Tech-Mechanical Engineering	1003173241	INDUSTRY ORIENTED MINI PROJECT	CO1	Understanding basic purpose of profession, professional ethics and various moral and social issues
	VR17	03	B.Tech-Mechanical Engineering			CO2	Acquiring knowledge of various roles of Enbgineer in applying ethical principles at various professional levels
	VR17	03	B.Tech-Mechanical Engineering			CO3	Awareness of professional rights and responsibilities of an Engineer, safety and risk benefit analysis of an Engineer
	VR17	03	B.Tech-Mechanical Engineering			CO4	Excelling in competitive and challenging environment to contribute to industrial growth
59	VR17	03	B.Tech-Mechanical Engineering	1003174101	CAD/CAM	CO1	Describe basic structure of CAD workstation, memory types, input-output devices and computer graphics
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply knowledge of mathematical concepts to geometry manipulation,modelling of curves, surfaces and solids
	VR17	03	B.Tech-Mechanical Engineering			CO3	Write a programs for NC operations using various methods available
	VR17	03	B.Tech-Mechanical Engineering			CO4	Apply the principles of GT, CAPP and CAQC to optimizing factory layouts and operations
60	VR17	03	B.Tech-Mechanical Engineering	1003174102	Automobile Engineering	CO1	Understand the lay-out of an automobile components and features of supercharging,turbo-charging with crank case ventilation
	VR17	03	B.Tech-Mechanical Engineering			CO2	Build the principles and working of various components in transmission system of automobile
	VR17	03	B.Tech-Mechanical Engineering			CO3	Distinguish the steering,suspension system,electrical and safety systems operation
	VR17	03	B.Tech-Mechanical Engineering			CO4	Explain the various emisson control systems and automobile sevice
61	VR17	03	B.Tech-Mechanical Engineering	1003174103	Power Plant Engineering	CO1	Understand the working principle of steam power plant .
	VR17	03	B.Tech-Mechanical Engineering			CO2	Illustrate the working of various power plants.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Evaluate the performance of power plants theoritically.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Analyze the economical feasibility of power plant and utilize the electrical , instrumentation & pollution control systems used in power plant
62	VR17	03	B.Tech-Mechanical Engineering	1003174104	Fundamentals of Acoustics & Vibration	CO1	Differentiate between various terms in acoustics and vibrations
	VR17	03	B.Tech-Mechanical Engineering			CO2	Analyse various degrees of systems in vibrations
	VR17	03	B.Tech-Mechanical Engineering			CO3	Define the mode shapes pattern encountered in day to day applications
	VR17	03	B.Tech-Mechanical Engineering			CO4	Relate noise control methods by measurement techniques
63	VR17	03	B.Tech-Mechanical Engineering	1003174105	Optimization and Reliability	CO1	Understand and comprehend the concepts of optimization and develop problem equation for a given scenario
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply, solve an engineering problem from a numerical point of view
	VR17	03	B.Tech-Mechanical Engineering			CO3	Write programming methods to solve a engineering problem
	VR17	03	B.Tech-Mechanical Engineering			CO4	Develop a problem formulation for a cantilever beam problem, and solve it
64	VR17	03	B.Tech-Mechanical Engineering	1003174106	Refrigeration & Air Conditioning	CO1	Understandthe various air refrigeration cycles and their analysis.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Illustrate the performance improvement methods in VCR systems.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Outline the refrigerant characteristics & components of the VCR system.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Apply the working principles of vapour absorption & Discuss the various non-conventional methods of refrigeration.
	VR17	03	B.Tech-Mechanical Engineering		Gas Dynamics	CO1	Understand density variation in fluid motion.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Identify isoentropic flow and analyze the ideal behavior of gases in one dimensional.

65	VR17	03	B.Tech-Mechanical Engineering	1003174107	& Jet Propulsion	CO3	Analyze gas flows with and without friction.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Analyze gas flows with and without heat and describe jet propulsion engines and basic concepts of rocket propulsion.
66	VR17	03	B.Tech-Mechanical Engineering	1003174108	CNC Machine Tools	CO1	Describe the features of numerical control and computer numerical control machine tools
	VR17	03	B.Tech-Mechanical Engineering			CO2	Develop the numerical control and computer aided part programming
	VR17	03	B.Tech-Mechanical Engineering			CO3	Distinguish the interpolators for linear and circular interpolation
	VR17	03	B.Tech-Mechanical Engineering			CO4	Analyse the tooling systems for computer numerical control machines
67	VR17	03	B.Tech-Mechanical Engineering	1003174109	Quality and Reliability Engineering	CO1	Understand the concepts of quality and the fundamentals of science of quality engineering
	VR17	03	B.Tech-Mechanical Engineering			CO2	Draw and construct control charts
	VR17	03	B.Tech-Mechanical Engineering			CO3	Infer from sampling plans and determine the quality parameter levels
	VR17	03	B.Tech-Mechanical Engineering			CO4	Define a house of quality for a given scenario and comprehend the concept of reliability with a significant emphasis on a design of a given component
68	VR17	03	B.Tech-Mechanical Engineering	1003174110	Composite Materials	CO1	Understand the concept of composites, can differentiate MMC's, PMS's, CMC's, able to tell the available reinforcing materials and their uses.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Differentiate different types of reinforcement's, matrix materials, and use of coupling agents
	VR17	03	B.Tech-Mechanical Engineering			CO3	Explain different fabrication techniques to fabricate composite materials
	VR17	03	B.Tech-Mechanical Engineering			CO4	Evaluate different failure theories and applications of different composite material.
69	VR17	03	B.Tech-Mechanical Engineering	1003174111	Condition Monitoring	CO1	Understand the basic vibration problems and develop mathematical models using Mass, spring and damper concepts.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply the different methods for measuring and vibrations.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Explain the core concepts of viewing,clipping,parametric curves and spot lighting.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Articulate the concepts of fault diagnosis of machines using Ultrasonic monitoring techniques.
70	VR17	03	B.Tech-Mechanical Engineering	1003174112	Computational Fluid Dynamics	CO1	Estimate errors using various computational methods.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply various numerical techniques to solve PDE's associated with governing equations applied in various engineering problems
	VR17	03	B.Tech-Mechanical Engineering			CO3	Explain momentum, energy, conservation laws and principles that are applied to conduction and convection problems using FDM approach.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Evalute various fluid flow and heat transfer problems using Finite volume approach.
71	VR17	03	B.Tech-Mechanical Engineering	1003174113	Green Engineering Systems	CO1	Distinguish various types of solar thermal collectors
	VR17	03	B.Tech-Mechanical Engineering			CO2	Describe the working of a photovoltaic system and wind energy conversion system
	VR17	03	B.Tech-Mechanical Engineering			CO3	Analyze the operation of fuel cells and biomass conversion technologies
	VR17	03	B.Tech-Mechanical Engineering			CO4	Elaborate on ocean, geothermal, electrical,mechanical systems and Utilize concept of green building and energy management
72	VR17	03	B.Tech-Mechanical Engineering	1003174114	Computer Graphics	CO1	Identify the principles and commonly used paradigms and techniques of computer graphics
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply mathematics and logic to develop computer programs for elementary graphics operations
	VR17	03	B.Tech-Mechanical Engineering			CO3	Explain the core concepts of viewing,clipping,parametric curves and spot lighting

	VR17	03	B.Tech-Mechanical Engineering			CO4	Articulate the concepts of 3D transformations, hidden surface elimination and Execute basic graphics application programs including animation
73	VR17	03	B.Tech-Mechanical Engineering	1003174115	Additive Manufacturing	CO1	Choose a suitable liquid based Rapid prototyping process based on the application of the product.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Select solid based Rapid prototyping process based on the application of the product.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Compare and contrast between the SLS and 3DP rapid prototyping processes
	VR17	03	B.Tech-Mechanical Engineering			CO4	Explain a rapid tooling process based on the specific requirement of a component
74	VR17	03	B.Tech-Mechanical Engineering	1003174121	CAD/CAM Lab	CO1	Draw two dimensional views of any mechanical component
	VR17	03	B.Tech-Mechanical Engineering			CO2	using Auto CAD software.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Create three dimensional part models and assemblies of
	VR17	03	B.Tech-Mechanical Engineering			CO4	machine components using Solidworks software.
75	VR17	03	B.Tech-Mechanical Engineering	1003174122	Vibration and Acoustics Lab	CO1	Understand the natural frequency of a different beams.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply the concepts of hammer and accelerometer method to determine the free vibrations.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Evaluate the effect of damping with various materials.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Determine the structural vibrations of a given objects.
76	VR17	03	B.Tech-Mechanical Engineering	1003174123	Simulation Lab(Mat-Lab Tools)	CO1	Understand the Graphing-Functions of one variable and two variables
	VR17	03	B.Tech-Mechanical Engineering			CO2	Creating simple plots, Adding titles, axis labels, and annotations
	VR17	03	B.Tech-Mechanical Engineering			CO3	Evaluate the array operations and Linear equations
	VR17	03	B.Tech-Mechanical Engineering			CO4	Determine the control flow and operators.
77	VR17	03	B.Tech-Mechanical Engineering	1003174124	Mechatronics Lab	CO1	Write PLC programs for control of traffic lights, water level, lifts and conveyor belts
	VR17	03	B.Tech-Mechanical Engineering			CO2	Analyze and simulate PID controllers for a physical system using MATLAB
	VR17	03	B.Tech-Mechanical Engineering			CO3	Develop pneumatic and hydraulic circuits using Automaton studio
	VR17	03	B.Tech-Mechanical Engineering			CO4	Design of components using design of synthesis principles
78	VR17	03	B.Tech-Mechanical Engineering	1003174131	Mechanical Synthesis Project	CO1	Acquire the manufacturing knowledge on utilizing practical facilities for development of mechanical synthesis project.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Design the links and assembly drawing of mechanism in the form of orthographic drawing with dimensioning
	VR17	03	B.Tech-Mechanical Engineering			CO3	Relate the various components, study and record the output of equipment with theoretical design values for validation
	VR17	03	B.Tech-Mechanical Engineering			CO4	Apply the effective manufacturing, thermal and design process with proper material, technical procedure of planning the work in the industry/workshop
79	VR17	03	B.Tech-Mechanical Engineering	1003174201	Production Planning and Control	CO1	Understand the basics of workflow and becomes well acquainted with line balancing and mixed model production theories.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Comprehend the concepts of demand forecasting and the quantitative methods to meet the market demand.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Differentiate EOQ, ABC and VED models.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Apply the concepts of demand, supply to the production planning across all industries.
	VR17	03	B.Tech-Mechanical Engineering			CO1	Understand the properties of constituents, classification of composites and their suitability for the structural applications.

80	VR17	03	B.Tech-Mechanical Engineering	1003174202	Advanced Materials	CO2	Categorize and process of different PMC, MMC & CCC with their applications
	VR17	03	B.Tech-Mechanical Engineering			CO3	Compute micromechanical analysis of Lamina.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Differentiate the smart materials,Nano materials in comparison with bulk materials.
81	VR17	03	B.Tech-Mechanical Engineering	1003174203	Nano-Technology	CO1	Discuss the fundamental principles of nanotechnology and their application to biomedical engineering
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply engineering and physics concepts to the nano-scale and non-continuum domain.
	VR17	03	B.Tech-Mechanical Engineering			CO3	choose appropriate synthesis technique to synthesize quantum nanostructures of desired size, shape and surface properties
	VR17	03	B.Tech-Mechanical Engineering			CO4	Evaluate state-of-the-art, characterization methods for nanomaterials, and determine nanomaterial safety and handling methods required during characterization.
82	VR17	03	B.Tech-Mechanical Engineering	1003174204	Thermal Equipment Design	CO1	Understand the principles of desigining for manufacturability and economic production
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply design rules to make machining easier, clean and honest
	VR17	03	B.Tech-Mechanical Engineering			CO3	Relate the general design considerations for casting and casting tolerances
	VR17	03	B.Tech-Mechanical Engineering			CO4	Define the various design principles in forming techniques of manufacturing
83	VR17	03	B.Tech-Mechanical Engineering	1003174205	Industrial fire and Safety	CO1	Understand the basic need for fire and safety requirements in any given setting like kitchen, manufacturing unit, petrol bunk
	VR17	03	B.Tech-Mechanical Engineering			CO2	Identify the safety equipment needed for a given setting like a testing laboratory
	VR17	03	B.Tech-Mechanical Engineering			CO3	Explain the history, background, and the purpose of making the laws from a safety standpoint.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Relatethe variety of fire equipment and understand their need/use for a given problem
84	VR17	03	B.Tech-Mechanical Engineering	1003174206	Mechatronics	CO1	Identification of different sensors, transducers, signal conditioning techniques
	VR17	03	B.Tech-Mechanical Engineering			CO2	Understanding and designing mechatronic motion logic control system and the key elements in its design
	VR17	03	B.Tech-Mechanical Engineering			CO3	Develop a PLC programming techniques with Microprocessor, ladder diagram for different logic Gates
	VR17	03	B.Tech-Mechanical Engineering			CO4	Understanding image fundamentals and Implementation of Micro Mechatronics System
85	VR17	03	B.Tech-Mechanical Engineering	1003174207	Design for Manufacture	CO1	Understand the principles of desigining for manufacturability and economic production
	VR17	03	B.Tech-Mechanical Engineering			CO2	Apply design rules to make machining easier, clean and honest
	VR17	03	B.Tech-Mechanical Engineering			CO3	Relate the general design considerations for casting and casting tolerances
	VR17	03	B.Tech-Mechanical Engineering			CO4	Define the various design principles in forming techniques of manufacturing
86	VR17	03	B.Tech-Mechanical Engineering	1003174208	Un Conventional Machining Processes	CO1	Design and analyze the surface finish and material removal in electro chemical grinding and electro chemical machining
	VR17	03	B.Tech-Mechanical Engineering			CO2	Estimate the material removal rate and effect of process parameters in EDM, EDG and wire cut EDM process
	VR17	03	B.Tech-Mechanical Engineering			CO3	Analyze the material removal rate in Electron Beam Machining and Laser Beam Machining processes and identify the effect of process parameters.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Analyze the material removal rate in Electron Dschargeiacharge with the effect of process parameters.
	VR17	03	B.Tech-Mechanical Engineering			CO1	Understand the basic concept of Radiography testing technique.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Relate the ultrasonic testing method in various applications with other methods.

87	VR17	03	B.Tech-Mechanical Engineering	1003174209	Non-Destructive Evaluation	CO3	Compare the liquid penetrant,eddy current, magnetic particle testing methods and discuss the advantages and shortcomings
	VR17	03	B.Tech-Mechanical Engineering			CO4	Discuss the active and passive techniques in Infrared and thermal testing along with industrial applications
88	VR17	03	B.Tech-Mechanical Engineering	1003174231	Main 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.
	VR17	03	B.Tech-Mechanical Engineering			CO2	Recognize the need of scheduling and realizing an engineering product design.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Realize the significance of real time applications, energy management and environmental affects.
	VR17	03	B.Tech-Mechanical Engineering			CO4	Obtain the skill of data collection and technical report writing.
89	VR17	03	B.Tech-Mechanical Engineering	1003174251	Technical Seminar	CO1	Construct the in depth knowledge about the courses of interest of student
	VR17	03	B.Tech-Mechanical Engineering			CO2	Demonstrate about various advanced sources of knowledge.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Develop communcation skills through presentation before a team of experts
	VR17	03	B.Tech-Mechanical Engineering			CO4	Understand the various courses of student in all the semesters
90	VR17	03	B.Tech-Mechanical Engineering	1003174261	Comprehensive Exam	CO1	Understand the reasons in which courses the student is interested/not intrested Test the student ability about the courses of study in the entire programme
	VR17	03	B.Tech-Mechanical Engineering			CO2	Discus on any topic from the overall courses of the under graduate level program.
	VR17	03	B.Tech-Mechanical Engineering			CO3	Identify need of optimum design of a mechanical component or an assembly
	VR17	03	B.Tech-Mechanical Engineering			CO4	Evaluate student knowledge on the courses of study
91	VR17	03	B.Tech-Mechanical Engineering	1003174281	Internship	CO1	Analyze the entrepreneurship design and the business environment
	VR17	03	B.Tech-Mechanical Engineering			CO2	Difine industrial policies
	VR17	03	B.Tech-Mechanical Engineering			CO3	Explain the business preparation
	VR17	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-49

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY(A)							
B.Tech. 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	VR17	19	B.Tech-Electronics and Computer Engineering	1000171101	English- I	CO1	Enhance English Language by relating the ideas of eminent personalities.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Articulate the technological advancements fluently.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Inculcate the art of thinking and writing clearly and logically.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Enact various themes through team work and learn the usage of vocabulary through humourous texts.
2	VR17	19	B.Tech-Electronics and Computer Engineering	1000171102	Engineering Mathematics-I	CO1	Solve the first and higher order linear differential equations.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Estimate extrema and series expansions of functions of several variables.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Interpret area and volume using double integral and triple integral.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Evaluate of solution of Ordinary differential equations by using Laplace Transform technique.
3	VR17	19	B.Tech-Electronics and Computer Engineering	1000171103	Engineering Mathematics-II	CO1	Estimate numerical solution of non Linear equation.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Construct Interpolating polynomial for the given data.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Calculate Numerical Solution of ODE and Numerical Integration.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Evaluate Fourier series and Fourier transforms for functions.
4	VR17	19	B.Tech-Electronics and Computer Engineering	1000171105	Computer Programming using C	CO1	Write compile and debug Programs in C language
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Use operators, data types and write programs
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Select the best loop construct for a given problem
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Design and implement C programs
5	VR17	19	B.Tech-Electronics and Computer Engineering	1000171106	Engineering Drawing	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Learn the principle of orthographic projections. Draw Orthographic projections of points, lines.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Draw the various types of planes and solids its views in different Positions
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Draw isometric views of simple objects
6	VR17	19	B.Tech-Electronics and Computer Engineering	1000171111	Applied chemistry	CO1	Identify different polymers and their Engineering applications.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Desribe various renwable and non- renwable energy resources.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Aquire the knoweldge of mechanism and principles measures of corrosion.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Illustrate green Synthesis,semi conductors, super conductors and their applications in industry .
7	VR17	19	B.Tech-Electronics and Computer Engineering	1000171121	English - Communication Skills Laboratory-I	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Articulate with others by using proper functions.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Enact the roles with proper body language.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Communicate fluently with proper pronunciation
8	VR17	19	B.Tech-Electronics and Computer Engineering	1000171124	IT Workshop	CO1	Understand the basic components and peripherals of a computer.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	To become familiar in configuring a system.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Learn the usage of productivity tools.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Acquire knowledge about the netiquette and cyber hygiene.
9	VR17	19	B.Tech-Electronics and Computer Engineering	1000171128	Computer Programming	CO1	Understand C programming development environment, compiling, debugging, and linking
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analyzing the complexity of problems, Modularize the problems into small modules and then convert

	VR17	19	B.Tech-Electronics and Computer Engineering	[illegible]	Programming Laboratory	CO3	Understand and apply the in-built functions and customized functions for solving the problems.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Understand and apply the pointers, memory allocation techniques and use of files for dealing
10	VR17	19	B.Tech-Electronics and Computer Engineering	1000171201	English- II	CO1	Develop communication skills by inferring the technological advancements.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Identify the life of eminent personalities.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Relate the importance of Environment and its sustainability to language learning
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Create the art of writing by applying apt vocabulary and grammar.
11	VR17	19	B.Tech-Electronics and Computer Engineering	1000171203	Engineering Mathematics-III	CO1	Solve simultaneous linear equations numerically using rank of a matrix and also Eigen values and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Identify and solve partial differential equations.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Calculate gradient of a scalar function, divergence and curl of a vector function.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Evaluate line, surface and volume integrals using appropriate integral theorems.
12	VR17	19	B.Tech-Electronics and Computer Engineering	1000171207	Applied physics	CO1	Describe the wave phenomena of light and working principle of optical instruments.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Apply the knowledge of basic quantum mechanics to understand wave equation.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Understanding the basic knowledge of free electon theory of materials.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Make use of the basic concepts of energy bands in crystalline solids to understand semiconductor
13	VR17	19	B.Tech-Electronics and Computer Engineering	1000171209	Network Analysis	CO1	Will analyze the RLC circuit's behavior in detailed.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze the performance of periodic waveforms.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, h &g).
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Analyze the filter design concepts in real world applications.
14	VR17	19	B.Tech-Electronics and Computer Engineering	1000171212	Environmental Studies	CO1	Elucidate the natural resource & their importance for the sustenance of life and recognises the need to
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Gives the broad view on the various attributes of pollution & and their impact & measure to reduce
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Debates on social issues both rural and urban environment possible means to combat the
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Educates about Environmental Impact Assessment, Environmental Impact Statement & Environmental
15	VR17	19	B.Tech-Electronics and Computer Engineering	1000171213	Data Structures	CO1	Apply advanced data structure strategies for exploring complex data structures.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Compare and contrast various data structures and design techniques in the area of performance
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Implement all data structures like stacks, queues, trees, lists and graphs and compare their
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Develop programs by nonlinear data structures such as tree and graphs
16	VR17	19	B.Tech-Electronics and Computer Engineering	1000171221	English Communication Skills Lab-2	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Articulate with others by using proper functions.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Enact the roles with proper body language.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Communicate fluently with proper pronunciation
17	VR17	19	B.Tech-Electronics and Computer Engineering	1000171222	Engineering Physics Laboratory	CO1	Experimentation of laws of vibrations in strenteched string
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Determination of velocity of sound, rigidity modulus of a wire, acceleration due to gravity,
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze the voltage vs. current characteristics of Zener diode and temperature vs. resistance
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Demonstration of formation Newton's rings, diffraction pattern using grating and induced
18	VR17	19	B.Tech-Electronics and Computer Engineering	1000171228	Data Structures Programming Lab	CO1	Develope searching and sorting techniques
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Implement single,double and circular linked lists
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Implement stacks and queues using arrays and linked lists

	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Delop programs by nonlinear data structures such as tree and graphs
19	VR17	19	B.Tech-Electronics and Computer Engineering	1004172101	Electronic Devices and Circuits	CO1	Explain the basic concepts of semiconductor physics and summarize the characteristics of PN
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Compare the construction, working principle of rectifiers, with and without filters with relevant
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Evaluate the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Eestimate the stabilization concepts with expressions and perform the analysis of small signal low frequency transistor amplifier circuits using
20	VR17	19	B.Tech-Electronics and Computer Engineering	1004172102	Switching Theory and Logic Design	CO1	Convert numeric information in different Number systems.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Solve the simple Boolean expressions using the theorems and postulates of Boolean algebra and to
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Design and analyze small combinational circuits and to use standard combinational
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Design and implement small sequential circuits and devices and to use standard sequential
21	VR17	19	B.Tech-Electronics and Computer Engineering	1004172103	Signals and Systems	CO1	Analyze the different signals spectral characteristics of continuous-time periodic and a
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Explain the process of sampling and the effects of under sampling,over sampling.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Evaluatae convolution both in time domain and frequency domain.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Interpret the Laplace transform and Z- transform for analysis of continuous-time and discrete-time
22	VR17	19	B.Tech-Electronics and Computer Engineering	1012172104	Software Engineering	CO1	Articulate the phases of SDLC from requirement gathering phase to design phase
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Apply the appropriate process models for the development of SDLC
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Design a prototype for a software design and user interface & apply strategies of coding & testing for
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Apply the knowledge about estimation and maintenance of software systems and modeling the
23	VR17	19	B.Tech-Electronics and Computer Engineering	1019172105	Object Oriented Programming	CO1	Apply the basic terminology of C++.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze programs in C++ language and use different data types in a computer program. Design
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Explaining with classes, objects and member functions, concepts of inheritance. Define and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Design the concepts of overloading of functions and operators, overriding and exception handling
24	VR17	19	B.Tech-Electronics and Computer Engineering	1099172106	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
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Evaluate the production theories and pricing policies of various enterprises.
	VR17	19	B.Tech-Electronics and Computer 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. Analyze different
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Able to prepare financial statements. Evaluate investment proposals using capital budgeting tools
25	VR17	19	B.Tech-Electronics and Computer Engineering	1004172121	Electronic Devices and Circuits Lab	CO1	Determine the V-I characteristics of zener diode, PN junction diode and its applications such as Half
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze the Input and Output characteristics of BJT in CE, CC configurations and design the CE
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Estimate the characteristics of FET & design the CS amplifier.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Examine the characteristics of SCR and UJT.
26	VR17	19	B.Tech-Electronics and Computer Engineering	1019172122	OOPS Lab	CO1	Understand the process of writing, compiling and executing programs in C++ using appropriate
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Implement the object oriented concepts in developing application using C++.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Developing applications in C++ using the understanding of Inheritance and polymorphism.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Evaluate the use of exception handling while developing a C++ application.
27	VR17	19	B.Tech-Electronics and Computer Engineering	1099172103	professional ethics and	CO1	Recognize importance of human values, harmony and ethical behavior in real life situations
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Describe the core values that shape the ethical behaviour of an engineer

27	VR17	19	B.Tech-Electronics and Computer Engineering	1099172103	ethics and human values	CO3	Recall basics of professional ethics and human values.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Listing sustained happiness through identifying the essentials of human values and skills.
28	VR17	19	B.Tech-Electronics and Computer Engineering	1019172201	PRINCIPLES OF COMMUNICATIONS	CO1	Understand the basic principle of communication system
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Describe the principles of Analog and Digital modulation techniques and be able to analyze their
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Explain the various communication system parameters for different types of modulation and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Distinguish various Analog and Digital modulation techniques.
29	VR17	19	B.Tech-Electronics and Computer Engineering	1004172202	CONTROL SYSTEMS	CO1	Understand the concepts of feedback and its advantages to various control systems
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze the transfer function characteristics of the given different order system and introducing
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Applying different approches for absolute stability and relative stability criteria.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Evaluating the system performance in non zero input conditions.
30	VR17	19	B.Tech-Electronics and Computer Engineering	1099172203	MANAGEMENT SCIENCE	CO1	Define management and its nature scope and functions and hierarchical levels and organizational
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Illustrate various functions of production and inventory management Determine the various
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze the process of matching manager qualifications with position requirements and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Compare the various contemporary issues of management
31	VR17	19	B.Tech-Electronics and Computer Engineering	1005172204	COMPUTER ORGANIZATION	CO1	Analyze the Performance of a computer using performance equation
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the different instruction types and calculate the effective address of an CO2 operand
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Demonstrate how a computer performs micro arithmetic operation.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Evaluate how the data transfer takes place using I/O mode, Interrupt, and DMA techniques with
32	VR17	19	B.Tech-Electronics and Computer Engineering	1004172205	PULSE AND DIGITAL CIRCUITS	CO1	Design linear and non-linear wave shaping circuits
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analyse various wave shaping circuits and signal generating circuits
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Examine the difference between multi vibrators and time base generators
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Evaluate different non sinusoidal signals generators and its use in experimental research areas
33	VR17	19	B.Tech-Electronics and Computer Engineering	1005172206	OPERATING SYSTEMS	CO1	Apply the appropriate process models for the application development of SDLC
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the phases of SDLC from requirement gathering phase to design phase CO2 via Analysis
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Analyzing the strategies for coding and testing phase in Software product CO3 development
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Apply the knowledge about estimation and maintenance of software systems and CO4
34	VR17	19	B.Tech-Electronics and Computer Engineering	1019172221	PULSE &DIGITAL CIRCUITS & COMMUNICATIONS LAB	CO1	Generation of sinusoidal and non-sinusoidal signals
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analysis and design of various multivibrators circuits.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Demonstrate the UJT relaxation oscillator and boot-strap sweep circuits.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Process of converting analog signal to digital signal via sampling, quantization, and coding.
35	VR17	19	B.Tech-Electronics and Computer Engineering	1019172222	OPERATING SYSTEMS LAB	CO1	Explain different problems related to process synchronization.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Apply deadlock prevention and deadlock detection algorithms
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Describe the concepts of paging and segmentation for memory management.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Describe different disk space allocation methods and free space management techniques
36	VR17	19	B.Tech-Electronics and Computer Engineering	1019172231	INDUSTRIAL VISIT	CO1	To create an Industrial environment and culture within the institution.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	To provide students hands on experience on, troubleshooting, maintenance, fabrication, innovation, record keeping, documentation etc
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	To inculcate innovative thinking and thereby preparing students for main project.

	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	To set up self maintenance cell within departments to ensure optimal usage of infrastructure facilities.
37	VR17	19	B.Tech-Electronics and Computer Engineering	1004173101	Linear IC Applications	CO1	Demonstrate basic operation and characteristics of op-amp.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Interpret different linear and non-linear applications of Op-Amp.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Design & analyze different types of active filters using Op-Amp.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Compare different types of ADC and DACs
38	VR17	19	B.Tech-Electronics and Computer Engineering	1004173104	Digital IC Applications	CO1	Understand the structure of commercially available digital integrated circuit families
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Learn the IEEE Standard 1076 Hardware Description Language (VHDL
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Model complex digital systems at several levels of abstractions, behavioural, structural, simulation,
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Analyze and design basic digital circuits with combinatorial and sequential logic CO4 circuits
39	VR17	19	B.Tech-Electronics and Computer Engineering	1019173105	MICROPROCESSORS AND MICROCONTROLLERS	CO1	Understand the concepts of architecture, memory organization of Intel 8086 microprocessor and Intel
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Summarize the concepts of addressing modes, instruction set of Intel 8086 microprocessor and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Develop an assembly language programs for simple problem statements of 8086, 8051 and PIC
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Design an interface between peripheral chips & processors using assembly language programs.
40	VR17	19	B.Tech-Electronics and Computer Engineering	1012173103	DATA BASE MANAGEMENT SYSTEMS	CO1	Identify the basic concepts and various data model used in database design , design ER model for a
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Apply relational database theory and be able to describe relational algebra expression, tuple and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Interpret the use of normalization and functional dependency, indexing and hashing technique used
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Apply and relate the concept of transaction, concurrency control and recovery in database.
41	VR17	19	B.Tech-Electronics and Computer Engineering	1005173102	PYTHON PROGRAMMING	CO1	Install Python IDE and run basic Python scripts.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the operators, functions, key Concepts of Object Oriented Programming in python
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Access Python from various online resources and import packages to the current working
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Develop front end GUI using Visualization Libraries and Multithreading techniques
42	VR17	19	B.Tech-Electronics and Computer Engineering	1019173121	IC Applications Lab	CO1	Design the various linear and Non Linear application of op-amp.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analyse oscillators and multivibrator circuits using op-amp
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Apply the operation of IC 555 Timers for various applications.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Examine the basic digital circuits with combinatorial and sequential logic circuits using
43	VR17	19	B.Tech-Electronics and Computer Engineering	1019173122	PYHTON PROGRAMMING LAB	CO1	Understand how to write, test, and debug simple Python programs
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python Develop
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Express different Decision Making statements and Functions
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Understand and summarize different File handling operations
44	VR17	19	B.Tech-Electronics and Computer Engineering	1019173123	DATABASE MANAGEMENT SYSTEMS LAB	CO1	Understand, appreciate and effectively explain the underlying concepts of database technologies
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Design and implement a database schema for a given problem-domain
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Populate and query a database using SQL DML/DDL commands.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS.
45	VR17	19	B.Tech-Electronics and Computer Engineering	1099173101	IPR & PATENTS	CO1	Interpret the various aspects of IPR
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Conclude importance of copyrights, trademarks and trade secrets
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Obtain patent rights for new innovation
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Elaborate on Privacy issues

46	VR17	19	B.Tech-Electronics and Computer Engineering	1019173201	DESIGN AND ANALYSIS OF ALGORITHMS	CO1	Able to analyze the performance of an algorithm in terms of time and space.
	VR17	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
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Identifying which designing technique can be used to solve a particular problem.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Knowing how to explore the solution space by using Branch and Bound technique
47	VR17	19	B.Tech-Electronics and Computer Engineering	1019173202	WEB DESIGN	CO1	Understand HTML tags to design static web pages
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Describe the basic concepts of Java Scripts to design dynamic web pages
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Familiarize the concepts of PHP and AJAX
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Analyze a given problem and apply requisite appropriate tools for designing dynamic and
48	VR17	19	B.Tech-Electronics and Computer Engineering	1004173203	VLSI Design	CO1	Compare the fabrication process for MOS,CMOS and BICMOS technologies along with their
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Explain the concepts of design rules during the layout design.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Estimate various scaling Models and factors and their effects on MOSFET parameters.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Evaluate various design issues of VLSI Circuits and illustrate FPGA Design
49	VR17	19	B.Tech-Electronics and Computer Engineering	1004173204	DIGITAL SIGNAL PROCESSING	CO1	Analyse the digital signals using various digital transforms DFT, FFT etc.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Design and realize various digital filters for digital signal processing
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Evaluate the different multi rate digital signal processing systems.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Illustrate the architecture of DSP processor
50	VR17	19	B.Tech-Electronics and Computer Engineering	1019173203	SOFTWARE PROJECT MANAGEMENT (OPEN ELECTIVE-I)	CO1	Match organizational needs to the most effective software development model.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the basic concepts and issues of software project management
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Effectively planning the software projects.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Implement the project plans through managing people, communications and change.
51	VR17	19	B.Tech-Electronics and Computer Engineering	1019173204	BIO-MEDICAL ENGINEERING (OPEN ELECTIVE-I)	CO1	Understand the Main instrument system and types of electrodes and transducers to extract
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Anatomy of heart, lungs, eye and ears. Devices to do tests on heart, lungs, eye and ears.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Diagnose & Monitor the health of patient in intensive care unit.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Improve usage of various processes and sockets in real-time applications
52	VR17	19	B.Tech-Electronics and Computer Engineering	1019173205	UNIX PROGRAMMING (OPEN ELECTIVE-I)	CO1	Analyze the architecture and features of UNIX Operating System
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Elaborate various file processing commands used in UNIX.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Build Regular expressions for pattern matching and apply them to various filters for a specific task.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Select appropriate actuators and sensors for a robot based on specific application.
53	VR17	19	B.Tech-Electronics and Computer Engineering	1003173203	ROBOTICS (OPEN ELECTIVE-I)	CO1	Identify various robot configuration and components
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Select appropriate actuators and sensors for a robot based on specific application
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Carry out kinematic and dynamic analysis for simple serial kinematic chains.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Perform trajectory planning for a manipulator by avoiding obstacles.
54	VR17	19	B.Tech-Electronics and Computer Engineering	1004173221	MICRO PROCESSORS & MICRO CONTROLLERS LAB	CO1	Develop the necessary Algorithm and Assembly Language Program for the arithmeticand logical
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Identify various interfacing cards and perform 8086 interfacing with different peripherals and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Implement different data transfer techniques with 8051 microcontroller.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Design a microcontroller for simple applications
	VR17	19	B.Tech-Electronics and Computer Engineering			CO1	Design the CMOS circuits for various combinational and sequential logic circuits using

55	VR17	19	B.Tech-Electronics and Computer Engineering	1004173222	VLSI Lab	CO2	Estimate the Back end layout design of various circuits and analyse it interms of area, power and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Explain the difference between layout and schematic using LVS tool.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Formulate various designs and verify the waveforms using eldo simulator tool.
56	VR17	19	B.Tech-Electronics and Computer Engineering	1019173221	WEB DESIGN Lab	CO1	Analyze a web page and identify its elements and attributes.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Build static and dynamic web pages using HTML and CSS.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Develop client side manipulations in web pages using Java Script.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Understanding various applications to implement in JDBC.
57	VR17	19	B.Tech-Electronics and Computer Engineering	1019173241	INDUSTRY ORIENTED MINI PROJECT	CO1	Create an Industrial environment and culture within the institution.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Provide students hands on experience on, troubleshooting, maintenance, fabrication, innovation, record keeping, documentation etc
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Inculcate innovative thinking and thereby preparing students for main project.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Set up self maintenance cell within departments to ensure optimal usage of infrastructure facilities.
58	VR17	19	B.Tech-Electronics and Computer Engineering	1019174101	DATA COMMUNICATON AND COMPUTER NETWORKS	CO1	Understanding of basic digital switching techniques.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze the OSI model, TCP/IP model, MAC layer protocols and LAN technologies
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Design of different Elementary Data Link Protocols.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Minimize the error by using different control methods
59	VR17	19	B.Tech-Electronics and Computer Engineering	1004174105	IOT AND ITS APPLICATIONS	CO1	Understand the Architectural view, protocols and applications of IoT.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analyse the communication protocols and standards used in IoT
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Design the simple IoT applications to monitor or control IoT devices using simulation or hardware.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	implementation of the real time IoT applications.
60	VR17	19	B.Tech-Electronics and Computer Engineering	1005174102	MACHINE LEARNING	CO1	Recognize the characteristics of machine learning that make it useful to real-world Problems
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervised
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Be able to use support vector machine, regularized regression algorithms
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Understand the concept behind neural networks for learning non-linear functions
61	VR17	19	B.Tech-Electronics and Computer Engineering	1004174102	DIGITAL IMAGE PROCESSING	CO1	Examine the fundamentals of gray scale and color image processing.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Apply different transforms and compression methods on image for image
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze the methods to extract information from the image in terms of spatial
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Validate the different techniques of color and multi resolution processing.
62	VR17	19	B.Tech-Electronics and Computer Engineering	1019174102	ADVANCED COMPUTER ARCHITECTURE (Elective-I)	CO1	Understand the Concept of Parallel Processing and its applications
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Implement the Hardware for Arithmetic Operations
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze the performance of different scalar Computers
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Develop the Pipelining Concept for a given set of Instructions
63	VR17	19	B.Tech-Electronics and Computer Engineering	1004174201	SATELLITE COMMUNICATIONS (Elective-I)	CO1	Outline orbital mechanics and launch methodologies
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Apply Concepts of Attitude and orbit control, telemetry, tracking, Command andmonitoring.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Design link power budget for satellites
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Compare satellite access techniques
64	VR17	19	B.Tech-Electronics and Computer Engineering	1019174103	SYSTEM PROGRAMMIN	CO1	Apply the various phases of compiler and compare its working with assembler.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Understand various concepts in assemblers and processors

64	VR17	19	B.Tech-Electronics and Computer Engineering	1019174103	G (Elective-I)	CO3	Classify machines by their power to recognize languages
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Analyze how linker and loader executable, interpreters and editors
65	VR17	19	B.Tech-Electronics and Computer Engineering	1019174104	FUNDAMENTALS OF DATA MINING AND DATA WAREHOUSING	CO1	Understand the concepts of data warehouse and data mining
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Use data pre-processing techniques to build data warehouse
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze transaction databases for association rules
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Understand the details of different algorithms made available by popular commercial data mining software and solve real data mining problems by
66	VR17	19	B.Tech-Electronics and Computer Engineering		STRUCTURAL DIGITAL DESIGN (Elective-II)	CO1	Understand the CAD Tools and VHDL language.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Design various combinational circuits and Sequential circuits using VHDL code
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Apply the Verilog language for testing of combinational and sequential circuits
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Analyze the Synthesis process and testing of digital logic circuits using CAD
67	VR17	19	B.Tech-Electronics and Computer Engineering	1012172205	OBJECT ORIENTED ANALYSIS AND DESIGN USING UML	CO1	Build solutions to the complex problems using object-oriented approach
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Identify classes and responsibilities of the problem domain
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Apply UML tools for various case studies
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Represent classes, objects, responsibilities and states using UML notations.
68	VR17	19	B.Tech-Electronics and Computer Engineering	1005174103	BIG DATA ANALYTICS (Elective-II)	CO1	Preparing for data summarization, query, and analysis.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Applying data modelling techniques to large data sets
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Creating applications for Big Data analytics
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Building a complete business data analytic solution
69	VR17	19	B.Tech-Electronics and Computer Engineering	1019174106	ANALOG IC DESIGN	CO1	Understand the concepts of MOS Devices, Modeling, Open-Loop Comparators and different
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze the characteristics of MOS with different Circuits.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Design any Analog Circuits in real time applications.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Extend the Analog Circuit Design to Different Applications in Real Time.
70	VR17	19	B.Tech-Electronics and Computer Engineering	1019174121	DIGITAL SIGNAL PROCESSING LAB	CO1	Develop various DSP Algorithms using MATLAB Software package.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Analyze and Observe Magnitude and phase characteristics (Frequency response
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Summerize the fundamentals of gray scale and color image processing
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Apply different transforms and compression methods on image for image processing
71	VR17	19	B.Tech-Electronics and Computer Engineering	1019174122	IOT LAB	CO1	Identify problems that are amenable to solution by various methods, and which different methods may
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Formalize a given problem in the language/framework of different methods.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Implement basic algorithms (e.g., standard search algorithms or dynamic programming).
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Design and carry out an empirical evaluation of different algorithms on problem formalization and
72	VR17	19	B.Tech-Electronics and Computer Engineering	1019174201	INTRODUCTION TO EMBEDDED SYSTEMS	CO1	Understand the basic concepts of an embedded system and able to know an embedded system
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Design the Embedded hardware by considering the hardware components required for an embedded
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Analyse the various embedded firmware design approaches on embedded environment to suit for
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Interprete how to integrate hardware and firmware of an embedded system and apply this knowledge to
73	VR17	19	B.Tech-Electronics and Computer Engineering	1012173201	SOFTWARE TESTING METHODOLOGIES	CO1	Understanding the purpose of Software Testing.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the Transaction Flow Testing and Dataflow testing
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Test the software using domain testing and Logic Based Testing

	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Apply the software testing tools for real world applications
74	VR17	19	B.Tech-Electronics and Computer Engineering	1019174202	DIGITAL IC DESIGN	CO1	Understand the concepts of MOS Design, Semiconductor Memories, Flash Memory, RAM
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Design and analysis of Combinational and Sequential MOS Circuits.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Extend the Digital IC Design to Different Applications.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Comparative analysis of all Parasitics.
75	VR17	19	B.Tech-Electronics and Computer Engineering	1019174203	AUTOMATA THEORY&COMPILER DESIGN	CO1	Construct LL, SLR, CLR and LALR parse table.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Understand Parser and its types i.e. Top-down and Bottom-up parsers.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Classify machines by their power to recognize languages
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Syntax directed translation, synthesized and inherited attributes and analyze techniques for code
76	VR17	19	B.Tech-Electronics and Computer Engineering	1019174204	ADVANCED MICROCONTROLLERS	CO1	Understand the evolution and architectures of ARM processors
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Apply the architectural features of ARM LPC2148 microcontrollers.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze and understand the instruction set and development tools of ARM
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Design an interfacing peripheral devices to ARM LPC2148
77	VR17	19	B.Tech-Electronics and Computer Engineering	1012173101	HUMAN COMPUTER INTERACTION	CO1	Understand concepts of Real-Time Operating systems.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Describe the basic functions of RTOS and programming concepts of RTOS
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Analyze the different case studies
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Create a new embedded software and can port it onto the board
78	VR17	19	B.Tech-Electronics and Computer Engineering	1019174205	REAL TIME OPERATING SYSTEMS	CO1	Understand the principles and practices involved in cryptography and network security
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Understand the various symmetric and Asymmetric encryption algorithms
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Identifying cryptographic protocols, hash functions, authentication, key management, key exchange,
	VR17	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
79	VR17	19	B.Tech-Electronics and Computer Engineering	1005174101	CRYPTOGRAPHY AND NETWORK SECURITY	CO1	Understand the principles and practices involved in cryptography and network security
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Explain the various symmetric and Asymmetric encryption algorithms
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Identifying cryptographic protocols, hash functions, authentication, key management, key exchange,
	VR17	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
80	VR17	19	B.Tech-Electronics and Computer Engineering	1019174206	WIRELESS SENSOR NETWORKS	CO1	Apply communication concepts to solve wireless communications problems.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Summarize existing model's and apply cellular system design concepts, wireless wide
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Analyse various multiple access schemes used in wireless communications and existing
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Demonstrate wireless local area networks and their specifications. Apply the concepts to orthogonal
81	VR17	19	B.Tech-Electronics and Computer Engineering	1004174101	CELLULAR AND MOBILE COMMUNICATIONS	CO1	Understand the concepts, characteristics, principles and operation of cellular systems.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Apply Concepts, principles to Co-channel interference Reduction factor, Desired C/I.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Analyse Point to point model, other cell coverage of signal and traffic, frequency and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Compare concepts of handoff and architectures of GSM, Technology comparison of 3G,4G and 5G
82	VR17	19	B.Tech-Electronics and Computer Engineering	1019174281	INTERNSHIP	CO1	Model the concepts and engineering tools to arrive at design solutions for the
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Exhibit critical thinking and problem solving skills by analysing underlying issues to
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Solve real life challenges in the workplace by analysing work environment and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Articulate career options by considering opportunities in company, sector, industry.

83	VR17	19	B.Tech-Electronics and Computer Engineering	1019174251	TECHNICAL SEMINAR	CO1	Carryout literature survey, and choose a relevant topic reported in recent IEEE/CSI/ACM/ conference publications / transactions in the
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Simulate and analyze the results reported in the chosen paper for seminar topic.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Communicate effectively before the expert panel and develop technical reports.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Respond to the queries raised by the evaluation committee and audience
84	VR17	19	B.Tech-Electronics and Computer Engineering	1019174261	COMPREHENSIVE VIVA	CO1	Demonstrate knowledge in the program domain.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Present views cogently and precisely.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Exhibit professional etiquette suitable for career progression.
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Apply computer science theory and software development fundamentals to produce computing-
85	VR17	19	B.Tech-Electronics and Computer Engineering	1019174231	MAIN PROJECT	CO1	Apply the software engineering principles in planning, formulating an innovative design/ approach and computing the requirements
	VR17	19	B.Tech-Electronics and Computer Engineering			CO2	Ability to perform individually as well as in a team, accepting responsibility, taking initiative, and
	VR17	19	B.Tech-Electronics and Computer Engineering			CO3	Ability to use formal and informal communications with team members and guide, make presentations
	VR17	19	B.Tech-Electronics and Computer Engineering			CO4	Develop/implement the solutions with appropriate techniques, resources and contemporary tools.

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

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY(A)							
B.TECH. 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	VR17	05	B.Tech-Computer Science and Engineering	1000171101	English -I	CO1	Enhance English Language by relating the ideas of eminent personalities.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Articulate the technological advancements fluently.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Inculcate the art of thinking and writing clearly and logically.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Enact various themes through team work and learn the usage of vocabulary through humourous texts.
2	VR17	05	B.Tech-Computer Science and Engineering	1000171102	ENGINEERING MATHEMATICS-I	CO1	Solve the first and higher order linear differential equations.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Estimate extrema and series expansions of functions of several variables.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Interpret area and volume using double integral and triple integral.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Evaluate solution of Ordinary differential equations by using Laplace Transform technique.
3	VR17	05	B.Tech-Computer Science and Engineering	1000171103	ENGINEERING MATHEMATICS-II	CO1	Estimate numerical solution of non Linear equation.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Construct Interpolating polynomial for the given data.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Calculate Numerical Solution of ODE and Numerical Integration.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Evaluate Fourier series and Fourier transforms for functions.
4	VR17	05	B.Tech-Computer Science and Engineering	1000171105	COMPUTER PROGRAMMING USING C	CO1	Interpret fundamentals of computers and convert flowcharts/algorithms to C Programs, compile and debug programs
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply decision making and Iterative feature of C Programming language effectively.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Design and implement programs to analyze the different pointer applications
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Apply structures and unions and Implement file Operations in C programming for any given application
5	VR17	05	B.Tech-Computer Science and Engineering	1000171106	ENGINEERING DRAWING	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply the principle of orthographic projections to draw Orthographic projections of points, lines.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Construct the various types of planes and solids its views in different Positions

	VR17	05	B.Tech-Computer Science and Engineering			CO4	Develop isometric views of simple objects
6	VR17	05	B.Tech-Computer Science and Engineering	1000171107	APPLIED PHYSICS	CO1	Describe the wave phenomena of light and working principle of optical instruments.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply the knowledge of basic quantum mechanics to understand wave equation.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Understanding the basic knowledge of free electron theory of materials.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Make use of the basic concepts of energy bands in crystalline solids to understand semiconductor physics.
7	VR17	05	B.Tech-Computer Science and Engineering	1000171121	ENGLISH - COMMUNICATION SKILLS LABORATORY-I	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Articulate with others by using proper functions.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Enact the roles with proper body language.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Communicate fluently with proper pronunciation
8	VR17	05	B.Tech-Computer Science and Engineering	1000171122	ENGINEERING PHYSICS LABORATORY	CO1	Experimentation of laws of vibrations in strenteched string
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Determination of velocity of sound, rigidity modulus of a wire, acceleration due to gravity, radius of gyration and Planck's constant.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Analyze the voltage vs. current characteristics of Zener diode and temperature vs. resistance characteristics of a thermistor
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Demonstration of formation Newton's rings, diffraction pattern using grating and induced magnetic field in a circular coil
9	VR17	05	B.Tech-Computer Science and Engineering	1000171128	COMPUTER PROGRAMMING LABORATORY	CO1	Analyze a given c program to identify bugs and write the appropriate code.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply decision making and Iterative feature of C Programming language to implement them effectively.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Build programs using functions, arrays and pointers.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Develop a c program for implementing user defined data types and implement file handling mechanisms.
10	VR17	05	B.Tech-Computer Science and Engineering	1000171201	ENGLISH-II	CO1	Develop communication skills by inferring the technological advancements.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Identify the life of eminent personalities.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Relate the importance of Environment and its sustainability to language learning

	VR17	05	B.Tech-Computer Science and Engineering			CO4	Create the art of writing by applying apt vocabulary and grammar.
11	VR17	05	B.Tech-Computer Science and Engineering	1000171203	ENGINEERING MATHEMATICS-III	CO1	Solve simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Identify and solve partial differential equations.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Calculate gradient of a scalar function, divergence and curl of a vector function.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Evaluate line, surface and volume integrals using appropriate integral theorems.
12	VR17	05	B.Tech-Computer Science and Engineering	1000171211	APPLIED CHEMISTRY	CO1	Identify different polymers and their Engineering applications.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Describe various renewable and non-renewable energy resources.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Acquire the knowledge of mechanism and principles measures of corrosion.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Illustrate green Synthesis, semi-conductors, super conductors and their applications in industry.
13	VR17	05	B.Tech-Computer Science and Engineering	1000171212	ENVIRONMENTAL STUDIES	CO1	Elucidate the natural resource & their importance for the sustenance of life and recognises the need to conserve natural resource.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Gives the broad view on the various attributes of pollution & and their impact & measure to reduce he pollution along with waste management.
	VR17	05	B.Tech-Computer Science and 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.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Educates about Environmental Impact Assessment, Environmental Impact Statement & Environmental Audit.
14	VR17	05	B.Tech-Computer Science and Engineering	1000171215	OBJECT ORIENTED PROGRAMMING THROUGH C++	CO1	Relate the procedural and object paradigm, streams, classes, functions, data and objects with real world entities
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply the concepts of function overloading, operator overloading, virtual functions and polymorphism
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Classify inheritance with understanding of early and late binding.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Evaluate advanced features of C++ specifically exception handling and Standard template library.
	VR17	05	B.Tech-Computer Science and Engineering		ENGINEERING	CO1	Analyze the force systems for equilibrium conditions and able to draw free body diagram.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Evaluate the frictional forces between contact surfaces.

15	VR17	05	B.Tech-Computer Science and Engineering	1000171216	MECHANICS	CO3	Able to differentiate between centroid and centre of gravity and determine Centroid, centre of gravity and second moment of area for composite Sections.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Analyse the motion and calculate trajectory characteristics.
16	VR17	05	B.Tech-Computer Science and Engineering	1000171221	ENGLISH COMMUNICATION SKILLS LAB-2	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Articulate with others by using proper functions.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Enact the roles with proper body language.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Communicate fluently with proper pronunciation
17	VR17	05	B.Tech-Computer Science and Engineering	1000171227	ENGINEERING CHEMISTRY LABORATORY	CO1	Learn and apply basic techniques used in Chemistry laboratory for small/medium scale water analysis.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Estimate the metal ions present in a domestic/industry sample solutions.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Utilize the fundamental laboratory techniques for titrations and synthetic procedures.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Analyze data and gain experimental skills through instrumentation
18	VR17	05	B.Tech-Computer Science and Engineering	1000171229	OBJECT-ORIENTED PROGRAMMING LAB	CO1	Analyze a given c++ program to identify bugs and write the appropriate code.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Examine the concepts of function overloading, operator overloading, exception handling and templates
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Build solution for a given scenario using appropriate OOP concepts
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Experiment the critical order problems using STL and Generic Programming
19	VR17	05	B.Tech-Computer Science and Engineering	1005172101	STATISTICS AND R PROGRAMMING	CO1	Outline R Studio and Programming with R
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Explain the controls statements, Loops, Operators and functions of Programming Structures using R
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Apply math functions and simulation to calculate probability and statistical distributions using R
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Perform Statistical tests using R to create and visualize graphics and explore datasets to create testable hypothesis and identify appropriate statistical tests.
20	VR17	05	B.Tech-Computer Science and Engineering	1005172102	MATHEMATICAL FOUNDATIONS OF	CO1	Solve mathematical proofs and can apply various optimization techniques.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Illustrate properties and characteristics of various graphs

20	VR17	05	B.Tech-Computer Science and Engineering	1005172102	IONS OF COMPUTER SCIENCE	CO3	Apply basic counting techniques to solve combinatorial probabilities and binomial problems
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Solve the recurrence relations using various techniques like homogenous, non homogenous and generating functions
21	VR17	05	B.Tech-Computer Science and Engineering	1005172103	DIGITAL LOGIC DESIGN	CO1	Perform number system conversions and interpret usage of codes in various applications.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Simplify the Boolean functions into minimum number of literals using k-maps, Boolean laws and tabular methods.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Design different combinational logic circuits.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Design synchronous counters and develop sequential circuit applications using flip flop and registers.
22	VR17	05	B.Tech-Computer Science and Engineering	1005172104	JAVA PROGRAMMING	CO1	Relate the procedural programming languages with object-oriented paradigm
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Use Exception handling and multithreading mechanisms to create exception free and parallel real-world applications
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Implement GUI for windows-based applications with modern tools
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Design various layouts along with applet usage
23	VR17	05	B.Tech-Computer Science and Engineering	1005172105	DATA STRUCTURES THROUGH C	CO1	Relate data structure concepts with real time applications.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply linear and nonlinear data structures by identifying the appropriate need.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Analyze searching and sorting techniques for effective management of data
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Design and implement operations of linear and nonlinear data structures
24	VR17	05	B.Tech-Computer Science and Engineering	1005172106	PROBLEM SOLVING AND PROGRAM DESIGN THROUGH C	CO1	Solve various basic mathematical problems by applying different programming techniques.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply various strategies to minimize the time complexity in problem solving.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Extend adequate programming skills that are needed for competitive coding.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Build applications using modular programming techniques.
25	VR17	05	B.Tech-Computer Science and Engineering	1005172121	DATASTRUCTURES THROUGH C LAB	CO1	Develop skills to design and analyze simple linear and non-linear data structures
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Identify and apply the suitable data structure for the given real-world problem
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Implement programs on linear data structures.

	VR17	05	B.Tech-Computer Science and Engineering			CO4	Perform basic operations on trees.
26	VR17	05	B.Tech-Computer Science and Engineering	1005172122	JAVA PROGRAMMING LAB	CO1	Implement the variants of overloading with real-time applicability
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Design various inheritance techniques using method overloading and overriding techniques
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Implement GUI Applications with modern tools
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Design various layouts along with applet usage
27	VR17	05	B.Tech-Computer Science and Engineering	1005172201	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.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression from queries.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Interpret the use of normalization and functional dependency, indexing and hashing technique used in database design.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Apply and relate the concept of transaction, concurrency control and recovery in database.
28	VR17	05	B.Tech-Computer Science and Engineering	1005172202	SOFTWARE ENGINEERING	CO1	Articulate the phases of SDLC from requirement gathering phase to design phase.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply the appropriate process models for the development of SDLC
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Design a prototype for a software design and user interface & apply strategies of coding & testing for the development of software product
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Apply the knowledge about cost effect estimation and maintenance of software system and modeling the software project by using CASE tools
29	VR17	05	B.Tech-Computer Science and Engineering	1005172203	ADVANCED DATA STRUCTURES	CO1	Apply the concepts of Graphs, Spanning trees and Analyse dictionary ADT along with hashing mechanisms.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Illustrate priority queues and their operations.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Build efficient Binary Search Trees and Multiway search trees.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Illustrate tries and issues related to the design of file structures.
30	VR17	05	B.Tech-Computer Science and Engineering	1005172204	COMPUTER ORGANIZATION	CO1	Apply the concepts of basic functional units to demonstrate the working of computational system.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Analyze the design issues in the development of processor and other components to articulate improvement in computer design.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Design Arithmetic Logic unit by analyzing performance issues

	VR17	05	B.Tech-Computer Science and Engineering			CO4	Compare various Memory organizations.
31	VR17	05	B.Tech-Computer Science and Engineering	1005172205	FORMAL LANGUAGES AND AUTOMATA THEORY	CO1	Outline finite automata and employ finite state machines to solve problems in computing
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Categorize language classes and grammars with the help of Chomsky Hierarchy and Design, analyze, interpret Regular languages, Expression and grammars
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Design PDA for solving computational Problems
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Classify Turing Machines and determine the decidability of computational problems
32	VR17	05	B.Tech-Computer Science and Engineering	1005172206	OPERATING SYSTEMS	CO1	Categorize and assess various types of operating systems and execution of system calls at each phase.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Analyze various process scheduling and memory management techniques to develop better solutions.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Formulation of dead lock management, resource management techniques and IPC abstraction.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Ability to perform tasks in Windows/ UNIX / Linux /Android and other environments.
33	VR17	05	B.Tech-Computer Science and Engineering	1005172221	ADVANCED DATA STRUCTURES LAB	CO1	Interpret and Execute the functions of Dictionary using Hashing
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Discover and choose appropriate data structures and algorithms, analyzing the ADT's and Libraries in design of algorithms for specific problem
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Estimate the efficiency of various algorithms and proofs of correctness
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Execute appropriate data structures in problem solving for various real time applications
34	VR17	05	B.Tech-Computer Science and Engineering	1005172222	DATABASE MANAGEMENT SYSTEMS LAB	CO1	Transform an information model into a relational database schema
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply Joins and Correlation operations on Sub-Queries
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Formulate query using SQL.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Implement pl/sql programs
35	VR17	05	B.Tech-Computer Science and Engineering	1005172231	INDUSTRIAL VISIT / ONLINE CERTIFICATION COURSE FROM	CO1	Experiment through interaction, working methods and employment practices.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Interact and learn from experts in the industry.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Connect openly on a global scale, with global learners and instructors.

	VR17	05	B.Tech-Computer Science and Engineering		NPTEL	CO4	Make use of multimedia platform for self learning
36	VR17	05	B.Tech-Computer Science and Engineering	1005173101	COMPILER DESIGN	CO1	Compare different types of language processors and design a lexical analyzer.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Identify the similarities and differences among various parsing techniques and grammar transformation techniques
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Analyze the role of a semantic analyzer and gain knowledge on the procedure for generating Syntax directed translation, synthesized and inherited attributes.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Evaluate the effectiveness of optimization and differentiates machine dependent and machine-independent optimizations.
37	VR17	05	B.Tech-Computer Science and Engineering	1005173102	PYTHON PROGRAMMING	CO1	Install Python IDE and run basic Python scripts and interpret basic principles of Python programming language.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply knowledge of Python constructs for developing programs/applications.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Import packages to the current working environment and create user defined modules.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Implement object oriented concepts and handle exceptions and files
38	VR17	05	B.Tech-Computer Science and Engineering	1005173103	DATA MINING TECHNIQUES	CO1	Identify stages in building a Data Warehouse and challenges in Data mining
	VR17	05	B.Tech-Computer Science and 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
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Analyze data mining techniques like classification and Association rules that can be applied to data objects and to find the interesting patterns.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Solve real world problems by using the various Clustering methods
39	VR17	05	B.Tech-Computer Science and Engineering	1005173104	UNIX AND SHELL PROGRAMMING	CO1	Analyze the architecture and features of UNIX Operating System
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Elaborate various file processing commands used in UNIX.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Build Regular expressions for pattern matching and apply them to various filters for a specific task.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Improve usage of various processes and sockets in real-time applications
40	VR17	05	B.Tech-Computer Science and Engineering	1005173105	DESIGN AND ANALYSIS OF ALGORITHMS	CO1	Analyze time complexity of algorithms using asymptotic notations
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply the divide-and-conquer and dynamic programming paradigms.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Compare the greedy and random algorithm paradigms to identify the design situations in randomization.

	VR17	05	B.Tech-Computer Science and Engineering			CO4	Create optimized solutions for state space tree algorithms using backtracking and branch-and-bound techniques.
41	VR17	05	B.Tech-Computer Science and Engineering	1099172103	Professional Ethics & Human Values	CO1	Relate Ethical Human Values
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply Engineering knowledge for societal ben
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Elaborate responsibility for Safety, Risk & righ
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Outline the various Current Global Issues
42	VR17	05	B.Tech-Computer Science and Engineering	1005173121	DATA MINING WITH R LAB	CO1	Install R Studio and Understand working with R
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply the data mining techniques with varied inputs for different parameters
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Understand the Datasets and Data pre processing and implement various graphs using R Software
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Demonstrate the working of Algorithms for data mining tasks such as association rule mining classification, clustering and regression.
43	VR17	05	B.Tech-Computer Science and Engineering	1005173122	PYTHON PROGRAMMING LAB	CO1	Analyze the given Python program to identify bugs and to rectify it.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply knowledge of Python constructs for developing programs/applications.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Implement object oriented concepts and exception handling mechanism.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Use Numpy and pandas libraries for handling data.
44	VR17	05	B.Tech-Computer Science and Engineering	1005173123	OPERATING SYSTEMS AND COMPILER DESIGN LAB	CO1	Implement various process scheduling and memory management techniques.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Implement various page replacement mechanisms.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Design lexical Analyzer for given language using C and Lex Tools.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Implement various parsers.
45	VR17	05	B.Tech-Computer Science and Engineering	1005173201	COMPUTER NETWORKS	CO1	Analyze the principles of layered approach select most appropriate architecture for any applications
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Identify the functionality of physical layer and analyze the contents in a given data link layer protocols, based on the layer concept.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocol.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Design the topological and routing strategies for an IP based networking infrastructure

46	VR17	05	B.Tech-Computer Science and Engineering	1005173202	WEB TECHNOLOGIES	CO1	Analyze a web page and identify its elements and attributes to create web pages using XHTML and Cascading Styles sheets.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Compile the basic concepts of Java Scripts to design dynamic web pages
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Analyze a given problem and apply requisite appropriate tools for designing dynamic and interactive web applications using PHP and AJAX
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Develop web application through PERL
47	VR17	05	B.Tech-Computer Science and Engineering	1005173203	OBJECT ORIENTED ANALYSIS AND DESIGN USING UML	CO1	Build solutions to complex problems using object oriented approach
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Identify classes and responsibility of the problem domain
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Represent classes, objects and states using UML Notations
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Apply UML tools for various case studies
48	VR17	05	B.Tech-Computer Science and Engineering	1005173204	ARTIFICIAL INTELLIGENCE	CO1	Identify Methods in AI that may be suited to solve a given problem and Game Playing
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Demonstrate AI search algorithms and formalizations on real world problems
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Analyze the basic issues of different types of knowledge representation techniques to build intelligent system
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Apply probabilistic and fuzzy models to solve problems with uncertainty.
49	VR17	05	B.Tech-Computer Science and Engineering	1004173207	DIGITAL IMAGE PROCESSING	CO1	Examine the fundamentals of gray scale and color image processing.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply different transforms and compression methods on image for image processing applications.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Analyze the methods to extract information from the image in terms of spatial filtering, frequency filtering, restoration and segmentation.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Validate the different techniques of color and multi resolution processing.
50	VR17	05	B.Tech-Computer Science and Engineering	1005173205	EMBEDDED SYSTEMS	CO1	Categorize embedded systems and summarize 8051 microcontroller architecture
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Identify the unique characteristics of real time systems
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Apply synchronization tools in various real time scenarios
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Define the unique design problems and challenges of real time systems

51	VR17	05	B.Tech-Computer Science and Engineering	1004173208	MICROPROCESSORS & MICROCONTROLLERS-A	CO1	Understand the concepts of architecture, memory organization of Intel 8086 microprocessor and Intel 8051 microcontrollers.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Demonstrate the concepts of addressing modes, instruction set of Intel 8086 microprocessor and Intel 8051
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Write assembly language programs for simple problem statements
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Design an interface between peripheral chips & processors and write programs for data transfer
52	VR17	05	B.Tech-Computer Science and Engineering	1003173203	ROBOTICS	CO1	Identify various robot configuration and components
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Select Appropriate actuators and sensors for a robot based on specific applications
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Analyze kinematic and dynamic analysis for simple serial kinematic chains
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Define trajectory planning for a manipulator by avoiding obstacles
53	VR17	05	B.Tech-Computer Science and Engineering	1005173291	MOOCS	CO1	Connect openly on a global scale, with global learners and instructors.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Develop high quality learning using multimedia platform.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Self assessment of their performance and learning process.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Develop a life long learning culture and updating the knowledge according with emerging trends.
54	VR17	05	B.Tech-Computer Science and Engineering	1099173101	IPR & PATENTS	CO1	Interpret the various aspects of IPR
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Conclude importance of Copyrights, Trademarks & Trade Secrets
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Obtain Patent Rights for New Innovations
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Elaborate on Privacy Issues
55	VR17	05	B.Tech-Computer Science and Engineering	1005173221	COMPUTER NETWORKS LAB	CO1	Establish the communication between peer -to peer systems
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Implement the different protocols
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Implement and compare the various routing algorithms
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Demonstrate program using sockets
	VR17	05	B.Tech-Computer Science and Engineering			CO1	Understand the UML notation to create effective and efficient system designs

56	VR17	05	B.Tech-Computer Science and Engineering	1005173222	UNIFIED MODELING LAB	CO2	Model Static view of a System using Use case Diagram
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Model Dynamic View of a system using UML diagram
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Represent user and Programmatic interactions using UML
57	VR17	05	B.Tech-Computer Science and Engineering	1005173223	WEB TECHNOLOGIES LAB	CO1	Create and design a static web pages using HTML and CSS
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Design dynamic web applications using JavaScript and explain how XML provides a standard method to access information
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Demonstrate database connectivity for developing web applications using PHP
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Create a dynamic, web based applications using PERL
58	VR17	05	B.Tech-Computer Science and Engineering	1005173241	INDUSTRY ORIENTED MINI 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.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Perform individually as well as in a team, accepting responsibility, taking initiative, and providing leadership, necessary to ensure project success
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Use formal and informal communications with team members and guide, make presentations and prepare technical document.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Develop/implement the solutions with appropriate techniques, resources and contemporary tools for social relevant issues/problems
59	VR17	05	B.Tech-Computer Science and Engineering	1005174101	CRYPTOGRAPHY AND NETWORK SECURITY	CO1	Identify basic security attacks and services
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Analyze the strengths and weaknesses of various symmetric encryption algorithms.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Apply the concepts of number theory and public key algorithms in cryptography
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Classify various cryptographic protocols, hash functions, digital signature schemes
60	VR17	05	B.Tech-Computer Science and Engineering	1099172106	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	CO1	Analyze the Demand, Price and Cost.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Identify the Nature of different markets to determine Price Output for different Business Units
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Build financial statements
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Evaluate investment project proposals

61	VR17	05	B.Tech-Computer Science and Engineering	1005174102	MACHINE LEARNING	CO1	Recognize the characteristics of machine learning and differentiate machine learning algorithms into supervised, unsupervised and semi supervised.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Solve classification problems using concept learning and decision trees
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Interpret of Dimensionality Reduction and vector machine algorithms
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Identify the concept behind neural networks for learning non-linear functions
62	VR17	05	B.Tech-Computer Science and Engineering	1005174103	BIG DATA ANALYTICS	CO1	Analyze Hadoop Architecture
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Acquire knowledge on Map Reduce Framework and implement various applications.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Develop applications using java language and implement programs by making use of hadoop i/o.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Implement Big data activities using PIG and HIVE.
63	VR17	05	B.Tech-Computer Science and Engineering	1005174104	MOBILE AD-HOC NETWORKS	CO1	Develop new applications in Manets and WSN.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Understand the need for security and the challenges and also the role of cross layer design in enhancing the network performance
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Develop algorithms/protocols for Manets and WSN.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Create new technical issue related to these new thrust areas and come up with a solution(s).
64	VR17	05	B.Tech-Computer Science and Engineering	1005174105	SOFTWARE PROJECT MANAGEMENT	CO1	Infer basic concepts and issues of software project management
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Conduct activities necessary to successfully complete and close the Software projects
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Estimate the effort required for a software project development and identify software risks.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Develop the skills for tracking and controlling software deliverables
65	VR17	05	B.Tech-Computer Science and Engineering	1004174105	INTERNET OF THINGS & ITS APPLICATIONS	CO1	Contrast the Architecture, protocols and applications of IoT.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Analyse the communication protocols and standards used in Io
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Design the simple IoT applications to monitor or control IoT devices using simulation or hardware
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Implement the real time IoT applications.
	VR17	05	B.Tech-Computer Science and Engineering			CO1	Usage of general software architecture of programs to create 2D&3D computer graphics.

66	VR17	05	B.Tech-Computer Science and Engineering	1012172201	COMPUTER GRAPHICS	CO2	Create 2D graphics through hardware system architecture for computer graphics
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Implementing procedures through recall of graphics pipeline, frame buffers, and graphic accelerators / co processors.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Estimate models for lighting/shading Color, ambient light, distant and light with sources, Phong reflection model and shading
67	VR17	05	B.Tech-Computer Science and Engineering	1005174106	CLOUD COMPUTING	CO1	Apply the knowledge of cloud technology to demonstrate the working principles of cloud
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Analyse cloud services extended by various cloud providers to build a cloud
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Identify emerging cloud programming paradigms and its software environments
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Design and develop the backup strategies for cloud data based on features.
68	VR17	05	B.Tech-Computer Science and Engineering	1012173203	SOFTWARE TESTING METHODOLOGIES	CO1	Reproduce models to effectively test the applications.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply techniques of transaction flow testing and dataflow testing in various programs.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Test the software using domain testing and Logic Based Testing
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Apply various software testing tools for real world applications
69	VR17	05	B.Tech-Computer Science and Engineering	1005174121	CRYPTOGRAPHY AND NETWORK SECURITY LAB	CO1	Evaluate different encryption algorithms on number theory
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Implement Symmetric cryptographic algorithms
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Implement Asymmetric cryptographic algorithms
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Implement Various Cryptographic Hash algorithms
70	VR17	05	B.Tech-Computer Science and Engineering	1005174122	BIGDATA ANALYTICS LAB	CO1	Implement programs by making use of hadoop i/o.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Apply data modeling techniques to large data sets
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Create applications for Big Data analytics
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Develop map reduce programs to solve real world problems which deals with big data
71	VR17	05	B.Tech-Computer Science and Engineering	1005174201	FUNDAMENTALS OF BLOCK	CO1	Choose functional/operational aspects of crypto currency ecosystem.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Make use of emerging abstract models for Blockchain Technology

71	VR17	05	B.Tech-Computer Science and Engineering	1005174201	CHAIN TECHNOLOGY	CO3	Identify major research challenges and technical gaps existing in between theory and practice in cryptocurrency domain.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Build fundamental characteristics of block chain using bit coin.
72	VR17	05	B.Tech-Computer Science and Engineering	1005174203	DISTRIBUTED SYSTEMS	CO1	Illustrate the basic elements and concepts related to distributed system technologies
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Tell the characteristics of distributed systems for designing architectural models
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Enumerate the features and applications of important standard protocols which are used in the distributed system
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Interpret inter-process communication in a distributed system
73	VR17	05	B.Tech-Computer Science and Engineering	1005174204	OPTIMIZATION TECHNIQUES	CO1	Formulate a physical problem into a mathematical model using linear programming problem and solve LPP using appropriate techniques like simplex method and its extensions
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Build and Solve Transportation and Assignment models
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Interpret how a task in a machine has to be processed in a particular order using sequencing Models and solve two-person zero sum games
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Illustrate the use of Simple Inventory Models in Practical Situations
74	VR17	05	B.Tech-Computer Science and Engineering	1005174205	CONCURRENT AND PARALLEL PROGRAMMING	CO1	Build, revise and execute concurrent and parallel algorithms.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Interpret the working of multi processor, multi core architectures and illustrating the work to avoid race condition.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Solve problems requiring both semaphores and events as part of the solution
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Implement different server architectures (topologies), e.g. client server, peer-to-peer, agent systems, grid architectures
75	VR17	05	B.Tech-Computer Science and Engineering	1005174251	INTERNSHIP	CO1	Apply domain knowledge during the course of internship
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Develop/implement the solutions with appropriate techniques, resources and contemporary tools.
	VR17	05	B.Tech-Computer Science and Engineering			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.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Exhibit integrity and ethical behaviour while carrying out the internship and for the preparation of internship report and to demonstrate effective oral and written communication skills

76	VR17	05	B.Tech-Computer Science and Engineering	1005174251	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.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Simulate and analyze the results reported in the chosen paper for seminar topic.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Communicate effectively before the expert panel and develop technical reports.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Respond to the queries raised by the evaluation committee and audience
77	VR17	05	B.Tech-Computer Science and Engineering	1005174261	COMPREHENSIVE VIVA	CO1	Demonstrate knowledge in the program domain.
	VR17	05	B.Tech-Computer Science and Engineering			CO2	Present views cogently and precisely.
	VR17	05	B.Tech-Computer Science and Engineering			CO3	Exhibit professional etiquette suitable for career progression.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Apply computer science theory and software development fundamentals to produce computing-based solutions.
77	VR17	05	B.Tech-Computer Science and Engineering	1005174231	MAIN 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.
	VR17	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 success
	VR17	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.
	VR17	05	B.Tech-Computer Science and Engineering			CO4	Develop/implement the solutions with appropriate techniques, resources and contemporary tools.

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY VISAKHAPATNAM

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

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY(A)							
B.TECH. INFORMATION TECHNOLOGY							
	COURSE OUTCOMES						
S.No	Regulation	Programme Code	Programme Name	Course Code	Course Name	CO	Course Outcome: After the completion of the course student will be able to
1	VR17	12	B.Tech-Information	1000171101	English –I	CO1	Enhance English Language by relating the ideas of eminent personalities.
	VR17	12	B.Tech-Information			CO2	Articulate the technological advancements fluently.
	VR17	12	B.Tech-Information			CO3	Inculcate the art of thinking and writing clearly and logically.
	VR17	12	B.Tech-Information			CO4	Enact various themes through team work and learn the usage of vocabulary through
2	VR17	12	B.Tech-Information	1000171102	Engineering Mathematics –I	CO1	Solve the first and higher order linear differential equations.
	VR17	12	B.Tech-Information			CO2	Estimate extrema and series expansions of functions of several variables.
	VR17	12	B.Tech-Information			CO3	Interpret area and volume using double integral and triple integral.
	VR17	12	B.Tech-Information			CO4	Evaluate of solution of Ordinary differential equations by using Laplace Transform
3	VR17	12	B.Tech-Information	1000171103	Engineering Mathematics – II	CO1	Estimate numerical solution of non Linear equation.
	VR17	12	B.Tech-Information			CO2	Construct Interpolating polynomial for the given data.
	VR17	12	B.Tech-Information			CO3	Calculate Numerical Solution of ODE and Numerical Integration.
	VR17	12	B.Tech-Information			CO4	Evaluate Fourier series and Fourier transforms for functions.
4	VR17	12	B.Tech-Information	1000171105	Computer Programming using C	CO1	Write compile and debug Programs in C language
	VR17	12	B.Tech-Information			CO2	Use operators, data types and write programs
	VR17	12	B.Tech-Information			CO3	Select the best loop construct for a given problem
	VR17	12	B.Tech-Information			CO4	Design and implement C programs
5	VR17	12	B.Tech-Information	1000171106	Engineering Drawing	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR17	12	B.Tech-Information			CO2	Draw isometric views of simple objects
	VR17	12	B.Tech-Information			CO3	Learn the principle of orthographic projections. Draw Orthographic projections of points, lines.
	VR17	12	B.Tech-Information			CO4	Draw the various types of planes and solids its views in different Positions
6	VR17	12	B.Tech-Information	1000171107	APPLIEDPHYSICS	CO1	Describe the wave phenomena of light and working principle of optical instruments.
	VR17	12	B.Tech-Information			CO2	Apply the knowledge of basic quantum mechanics to understand wave equation.
	VR17	12	B.Tech-Information			CO3	Understanding the basic knowledge of free electon theory of materials.
	VR17	12	B.Tech-Information Technology			CO4	Make use of the basic concepts of energy bands in crystalline solids to understand semiconductor physics.
7	VR17	12	B.Tech-Information	1000171121	ENGLISH–COMMUNICATIONSKILLS LAB - I	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	12	B.Tech-Information			CO2	Articulate with others by using proper functions.
	VR17	12	B.Tech-Information			CO3	Enact the roles with proper body language.
	VR17	12	B.Tech-Information			CO4	Communicate fluently with proper pronunciation
	VR17	12	B.Tech-Information		ENGINEERING	CO1	Experimentation of laws of vibrations in strenteched string
	VR17	12	B.Tech-Information Technology			CO2	Determination of velocity of sound, rigidity modulus of a wire, acceleration due to gravity, radius of gyration and Planck's constant.

8	VR17	12	B.Tech-Information Technology	1000171122	PHYSICSLABORATORY	CO3	Analyze the voltage vs. current characteristics of Zener diode and temperature vs. resistance characteristics of a thermistor
	VR17	12	B.Tech-Information Technology			CO4	Demonstration of formation Newton's rings, diffraction pattern using grating and induced magnetic field in a cirucuclar coil.
9	VR17	12	B.Tech-Information Technology	1000171128	COMPUTER PROGRAMMING LABORATORY	CO1	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development
	VR17	12	B.Tech-Information Technology			CO2	Analyzing the complexity of problems, Modularize the problems into small modules and then convert
	VR17	12	B.Tech-Information			CO3	Understand and apply the in-built functions and customized functions for solving the
	VR17	12	B.Tech-Information Technology			CO4	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
10	VR17	12	B.Tech-Information	1000171201	ENGLISH-II	CO1	Develop communication skills by inferring the technological advancements.
	VR17	12	B.Tech-Information			CO2	Identify the life of eminent personalities.
	VR17	12	B.Tech-Information			CO3	Relate the importance of Environment and its sustainability to language learning
	VR17	12	B.Tech-Information			CO4	Create the art of writing by applying apt vocabulary and grammar.
11	VR17	12	B.Tech-Information Technology	1000171203	ENGINEERING MATHEMATICS-III	CO1	Solve simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square
	VR17	12	B.Tech-Information			CO2	Identify and solve partial differential equations.
	VR17	12	B.Tech-Information			CO3	Calculate gradient of a scalar function, divergence and curl of a vector function.
	VR17	12	B.Tech-Information			CO4	Evaluate line, surface and volume integrals using appropriate integral theorems.
12	VR17	12	B.Tech-Information	1000171211	APPLIEDCHEMISTRY	CO1	Identify different polymers and their Engineering applications.
	VR17	12	B.Tech-Information			CO2	Desribe various renwable and non- renwable energy resources.
	VR17	12	B.Tech-Information			CO3	Aquire the knoweldge of mechanism and principles measures of corrosion.
	VR17	12	B.Tech-Information			CO4	Illustrate green Synthesis,semi conductors, super conductors and their applications in
13	VR17	12	B.Tech-Information Technology	1000171212	ENVIRONMENTALSTUDIES	CO1	*Elucidate the natural resource & their importance for the sustenance of life and recognises the need to conserve natural resource*
	VR17	12	B.Tech-Information Technology			CO2	Gives the broad view on the various attributes of pollution & and their impact & measure to reduce he pollution along with waste
	VR17	12	B.Tech-Information Technology			CO3	Debates on social issues both rural and urban environment possible means to combat the challenges and trace the legislation of India towards sustainability
	VR17	12	B.Tech-Information Technology			CO4	Educates about Environmental Impact Assessment, Environmental Impact Statement & Environmental Audit
14	VR17	12	B.Tech-Information Technology	1000171215	OBJECT ORIENTED PROGRAMMING THROUGH C++	CO1	Write, compile and debug programs in C++ language. Use different data types in a computer
	VR17	12	B.Tech-Information			CO2	Design programs involving decision structures, loops and functions
	VR17	12	B.Tech-Information			CO3	Explain the difference between call by value and call by reference.
	VR17	12	B.Tech-Information Technology			CO4	Usage of generic programming, over loading of functions and operators, overriding and exception
	VR17	12	B.Tech-Information			CO1	Analyze the force systems for equilibrium conditions and able to draw free body diagram.

15	VR17	12	B.Tech-Information	1000171216	ENGINEERING MECHANICS	CO2	Evaluate the frictional forces between contact surfaces.
	VR17	12	B.Tech-Information Technology			CO3	Able to differentiate between centroid and centre of gravity and determine Centroid, centre of gravity and second moment of area
	VR17	12	B.Tech-Information			CO4	Analyse the motion and calculate trajectory characteristics.
16	VR17	12	B.Tech-Information	1000171221	ENGLISH-COMMUNICATIONS KILLS LAB -2	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	12	B.Tech-Information			CO2	Articulate with others by using proper functions.
	VR17	12	B.Tech-Information			CO3	Enact the roles with proper body language.
	VR17	12	B.Tech-Information			CO4	Communicate fluently with proper pronunciation
17	VR17	12	B.Tech-Information	1000171227	ENGINEERING CHEMISTRY LABORATORY	CO1	Learn and apply basic techniques used in Chemistry laboratory for small/medium scale
	VR17	12	B.Tech-Information			CO2	Estimate the metal ions present in a domestic/industry sample solutions.
	VR17	12	B.Tech-Information			CO3	Utilize the fundamental laboratory techniques for titrations and synthetic procedures.
	VR17	12	B.Tech-Information			CO4	Analyze data and gain experimental skills through instrumentation
18	VR17	12	B.Tech-Information	1000171229	OBJECT-ORIENTED PROGRAMMING LAB	CO1	Explain what constitutes an object-oriented approach to programming
	VR17	12	B.Tech-Information			CO2	Identify potential benefits of object-oriented programming over other approaches.
	VR17	12	B.Tech-Information			CO3	Apply an object-oriented approach to developing applications of varying
	VR17	12	B.Tech-Information			CO4	solve the critical order problems using STL and Generic Programming
19	VR17	12	B.Tech-Information	1005172101	Statistics and R Programming	CO1	Outline R Studio and Programming with R
	VR17	12	B.Tech-Information			CO2	Explain the controls statements, Loops, Operators and functions of Programming
	VR17	12	B.Tech-Information			CO3	Apply math functions and simulation to calculate probability and statistical distributions
	VR17	12	B.Tech-Information Technology			CO4	Perform Statstical tests using R to create and visualize graphics and explore datasets to create testable hypothesis and identify appropriate stastical tests.
20	VR17	12	B.Tech-Information	1005172102	MATHEMATICAL FOUNDATIONS OFCOMPUTER SCIENCE 1005172102	CO1	Solve mathematical proofs and can apply various optimization techniques.
	VR17	12	B.Tech-Information			CO2	Illustrate properties and characteristics of various graphs
	VR17	12	B.Tech-Information			CO3	Apply basic counting techniques to solve combinatorial probabilities and binomial
	VR17	12	B.Tech-Information Technology			CO4	Solve the recurrence relations using various techniques like homogenous,nonhomogenous and generating functions
21	VR17	12	B.Tech-Information	1005172103	DIGITAL LOGIC DESIGN	CO1	Perform number system conversions and intrepret usage of codes in various applications.
	VR17	12	B.Tech-Information Technology			CO2	Simplify the Boolean functions into minimum number of literals using k-maps,boolean laws and tabular methods.
	VR17	12	B.Tech-Information			CO3	Design different combinational logic circuits.
	VR17	12	B.Tech-Information Technology			CO4	Design synchronous counters and develop sequential circuit applications using flip flop and registers.
22	VR17	12	B.Tech-Information	1012172104	SOFTWARE ENGINEERING	CO1	Applying appropriate process models for the application development of SDLC
	VR17	12	B.Tech-Information			CO2	Articulate the phases of SDLC from requirement gathering phase to design phase
	VR17	12	B.Tech-Information			CO3	Analyzing the strategies for coding and testing phase in Software product development
	VR17	12	B.Tech-Information Technology			CO4	Apply the knowledge about estimation and maintenance of software systems and modeling the software project by using CASE tools

23	VR17	12	B.Tech-Information	1005172105	DATA STRUCTURES THROUGH C	CO1	Relate data structure concepts with real time applications.
	VR17	12	B.Tech-Information			CO2	Apply linear and non linear data structures by identifying the appropriate need.
	VR17	12	B.Tech-Information			CO3	Analyze searching and sorting techniques for effective management of data
	VR17	12	B.Tech-Information			CO4	Design and implement operations of linear and nonlinear data structures
24	VR17	12	B.Tech-Information	1012172106	PYTHON PROGRAMMING	CO1	Enumerate different environments to install Python IDE and run basic Python scripts.
	VR17	12	B.Tech-Information Technology			CO2	Learn and use the operators, functions, key Concepts of Object Oriented Programming in python.
	VR17	12	B.Tech-Information Technology			CO3	Access Python from various online resources and import packages to the current working environment.
	VR17	12	B.Tech-Information			CO4	Develop front end GUI using Visualization Libraries and Multithreading techniques.
25	VR17	12	B.Tech-Information Technology	1012172121	DATA STRUCTURES THROUGH LAB	CO1	Design and analyze the time and space efficiency of the data structure be capable to identity the appropriate data structure for given
	VR17	12	B.Tech-Information			CO2	Have practical knowledge on the application of data structures using Linked Lists
	VR17	12	B.Tech-Information			CO3	Implementing programs stacks and queues using arrays and linked lists
	VR17	12	B.Tech-Information			CO4	Develop programs by nonlinear data structures such as tree and graphs
26	VR17	12	B.Tech-Information Technology	1012172122	PYTHON PROGRAMMING LAB	CO1	Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python and Develop Python programs step-wise by defining functions and calling them
	VR17	12	B.Tech-Information			CO2	Using different Decision Making statements and Functions in real world applications
	VR17	12	B.Tech-Information			CO3	Associating File handling operations to various domains and applications
	VR17	12	B.Tech-Information			CO4	Explain how to design GUI Applications in Python and evaluate different database
27	VR17	12	B.Tech-Information	1012172201	COMPUTER GRAPHICS	CO1	Usage of general software architecture of programs to create 2D&3D computer graphics.
	VR17	12	B.Tech-Information			CO2	Create 2D graphics through hardware system architecture for computer graphics
	VR17	12	B.Tech-Information Technology			CO3	Implementing procedures through recall of graphics pipeline, frame buffers, and graphic accelerators / co processors.
	VR17	12	B.Tech-Information Technology			CO4	Estimate models for lighting/shading Color, ambient light, distant and light with sources, Phong reflection model and shading
28	VR17	12	B.Tech-Information Technology	1012172202	JAVA PROGRAMMING	CO1	Reproducing the concepts and features of object oriented programming in Java for real world applications
	VR17	12	B.Tech-Information			CO2	Describe and implement the programs using command line arguments and Scanner Class.
	VR17	12	B.Tech-Information			CO3	Analyze and implement the concepts of Inheritances and Multithreading with real
	VR17	12	B.Tech-Information			CO4	Develop GUI programs using Applets and Event Handling.
29	VR17	12	B.Tech-Information	1012172203	E-COMMERCE	CO1	Identify, interpret and analyze needs of stakeholder
	VR17	12	B.Tech-Information			CO2	Identify and apply relevant problem solving methodologies in e-commerce applications
	VR17	12	B.Tech-Information Technology			CO3	Design components, systems and/or processes to meet required specifications for different applications
	VR17	12	B.Tech-Information			CO4	Hypothesizing research methods for various domains.
	VR17	12	B.Tech-Information Technology			CO1	Extend basics of organizational and architectural issues for a digital computer and perform computer arithmetic operations.

30	VR17	12	B.Tech-Information Technology	1012172204	COMPUTER ORGANIZATION & ARCHITECTURE	CO2	Analyze performance issues in processor and calculate the effective address of an operand by addressing modes.
	VR17	12	B.Tech-Information Technology			CO3	Ability to design memory organization that uses banks for different word size operations to understand the concept of cache memory techniques
	VR17	12	B.Tech-Information			CO4	Assess the concept of Input / Output organization in making efficient programs to
31	VR17	12	B.Tech-Information	1012172205	OBJECT ORIENTED ANALYSIS AND DESIGN USING UML	CO1	Build solutions to the complex problems using object oriented approach
	VR17	12	B.Tech-Information			CO2	Fabricate the classes and responsibilities for the problem domain
	VR17	12	B.Tech-Information			CO3	Apply different UML tools for various case studies
	VR17	12	B.Tech-Information			CO4	Represent classes, objects, responsibilities and states using UML notations.
32	VR17	12	B.Tech-Information	1012172206	LANGUAGE PROCESSORS	CO1	Construct LL, SLR, CLR and LALR parse table.
	VR17	12	B.Tech-Information			CO2	Understand types of parsers and develop models to increase efficiency
	VR17	12	B.Tech-Information			CO3	Classify machines by their power to recognize languages
	VR17	12	B.Tech-Information Technology			CO4	Synthesize inherited attributes, syntax directed translation and analyze techniques for code optimization
33	VR17	12	B.Tech-Information Technology	1012172221	UNIFIED MODELING LANGUAGE LAB	CO1	Sketch modeling with UML by Deploying Structural Modeling, Behavioural Modeling, Architectural Modeling using various tools
	VR17	12	B.Tech-Information Technology			CO2	Usage of various object relationships: inheritance, association, whole-part, and dependency relationships
	VR17	12	B.Tech-Information			CO3	Apply knowledge of UML model in developing object oriented software.
	VR17	12	B.Tech-Information			CO4	Choose the appropriate model and design method for a specified applications
34	VR17	12	B.Tech-Information Technology	1012172222	JAVA PROGRAMMING LAB	CO1	Correlate the basics of Java programming, Inheritance, Multithreading and Exception Handling in various domains.
	VR17	12	B.Tech-Information			CO2	Pretaining skills to apply OOP and Java programming in problem solving
	VR17	12	B.Tech-Information			CO3	build applications using GUI based concepts like Applets and AWT
	VR17	12	B.Tech-Information			CO4	Ability to extend his/her knowledge in Java programming with his/her own business logic
35	VR17	12	B.Tech-Information	1012173101	HUMAN COMPUTER INTERACTION	CO1	Comprehend human behaviour and computational abilities to overcome limitations
	VR17	12	B.Tech-Information			CO2	formulating fundamental aspects of designing and evaluating interfaces.
	VR17	12	B.Tech-Information			CO3	Apply new theories, tools and techniques in Human Computer interaction
	VR17	12	B.Tech-Information			CO4	Analyze and design software systems, components to meet desired needs.
36	VR17	12	B.Tech-Information	1012173102	ADVANCED JAVA PROGRAMMING	CO1	Develop advanced HTML pages with the help of tags and scripting language.
	VR17	12	B.Tech-Information			CO2	Summarize the scope, life cycles, request and response headers in java applications.
	VR17	12	B.Tech-Information			CO3	Construct a Web Application using Servlets
	VR17	12	B.Tech-Information			CO4	Design Web interface using Java Server Pages
37	VR17	12	B.Tech-Information	1012173103	DATA BASE MANAGEMENT SYSTEMS	CO1	Illustrate ER model and normalization for database design.
	VR17	12	B.Tech-Information			CO2	Create, maintain and manipulate a relational database using SQL
	VR17	12	B.Tech-Information			CO3	Design and build database system for a given real world problem.
	VR17	12	B.Tech-Information			CO4	Examine issues in data storage and query processing and can formulate appropriate

38	VR17	12	B.Tech-Information Technology	1012173104	UNIX PROGRAMMING	CO1	Extract architecture and features of UNIX Operating System and differentiate it from other Operating Systems
	VR17	12	B.Tech-Information			CO2	Use of UNIX commands for various file handling and process control strategies.
	VR17	12	B.Tech-Information			CO3	Build Regular expressions for pattern matching and apply them to various filters for a specific
	VR17	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
39	VR17	12	B.Tech-Information Technology	1005172206	OPERATING SYSTEMS	CO1	Categorize and assess various types of operating systems and execution of system calls at each phase.
	VR17	12	B.Tech-Information			CO2	Analyze various process scheduling and memory management techniques to develop
	VR17	12	B.Tech-Information			CO3	Formulation of dead lock management, resource management techniques and IPC
	VR17	12	B.Tech-Information			CO4	Ability to perform tasks in Windows/ UNIX / Linux /Android and other environments.
40	VR17	12	B.Tech-Information	1012173121	ADVANCED JAVA PROGRAMING LAB	CO1	Expermenting various validation procedures of Web Pages using HTML
	VR17	12	B.Tech-Information			CO2	Apply the advanced concepts of Java Servlets, JSP to web interfaces
	VR17	12	B.Tech-Information			CO3	Illustrate the usage of Java Beans in Real time Applications
	VR17	12	B.Tech-Information			CO4	Establishing the communication link between Client and Server through JDBC
41	VR17	12	B.Tech-Information	1012173122	UNIX AND OPERATING SYSTEMS LAB	CO1	Experiment Unix utilities and perform basic shell control of the utilities
	VR17	12	B.Tech-Information			CO2	Create effective file access control methods for handling Unix file system.
	VR17	12	B.Tech-Information			CO3	Developing shell scripts to automate various tasks
	VR17	12	B.Tech-Information			CO4	Implementing various methods involved in development of operating system
42	VR17	12	B.Tech-Information	1012173123	DATA BASE MANAGEMENT SYSTEM LAB	CO1	Examine syntax and working of various commands in various database models.
	VR17	12	B.Tech-Information			CO2	Design and implement a database schema for a given problem-domain
	VR17	12	B.Tech-Information			CO3	Populate and query a database using SQL DML/DDL commands
	VR17	12	B.Tech-Information Technology			CO4	Apply PL/SQL programming including stored procedures, stored functions, cursors, packages in validation of database schema.
43	VR17	12	B.Tech-Information	1099172103	PROFESSIONAL ETHICS & HUMAN VALUES	CO1	Relate Ethical Human Values
	VR17	12	B.Tech-Information			CO2	Apply Engineering knowledge for societal benefits
	VR17	12	B.Tech-Information			CO3	Elaborate responsibility for Safety, Risk & rights
	VR17	12	B.Tech-Information			CO4	Outline the various Current Global Issues
44	VR17	12	B.Tech-Information	1005173201	COMPUTER NETWORKS	CO1	Analyze the principles of layered approach select most appropriate architecture for any
	VR17	12	B.Tech-Information Technology			CO2	Identify the functionality of physical layer and analyze the contents in a given data link layer protocols, based on the layer concept.
	VR17	12	B.Tech-Information Technology			CO3	Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocol.
	VR17	12	B.Tech-Information			CO4	Design the topological and routing strategies for an IP based networking infrastructure
45	VR17	12	B.Tech-Information Technology	1005173202	WEB TECHNOLOGIES	CO1	Analyze a web page and identify its elements and attributes to create web pages using XHTML and Cascading Styles sheets.
	VR17	12	B.Tech-Information			CO2	Compile the basic concepts of Java Scripts to design dynamic web pages
	VR17	12	B.Tech-Information Technology			CO3	Analyze a given problem and apply requisite appropriate tools for designing dynamic and interactive web applications using PHP and

	VR17	12	B.Tech-Information			CO4	Develop web application through PERL
46	VR17	12	B.Tech-Information	1012173201	SOFTWARE TESTING METHODOLOGIES	CO1	Reproduce models to effectively test the applications.
	VR17	12	B.Tech-Information			CO2	Apply techniques of transaction flow testing and dataflow testing in various programs
	VR17	12	B.Tech-Information			CO3	Test the software using domain testing and Logic Based Testing
	VR17	12	B.Tech-Information			CO4	Apply various software testing tools for real world applications
47	VR17	12	B.Tech-Information	1012173202	DATA WARE HOUSING & DATA MINING	CO1	Model data warehouse in addition to traditional operational database systems
	VR17	12	B.Tech-Information			CO2	Apply mathematical strategies in data preprocessing techniques
	VR17	12	B.Tech-Information			CO3	Execute the datamining models to analyze the efficiency in the applied domians.
	VR17	12	B.Tech-Information			CO4	Solve real data mining problems through various tools and visualizing interesting
48	VR17	12	B.Tech-Information	1012173203	SOCIAL NETWORKS AND SEMANTIC WEB	CO1	Examine and Articulate semantic web basics, architecture and technologies.
	VR17	12	B.Tech-Information Technology			CO2	Apply semantic relationships among these data elements using Resource Description Framework
	VR17	12	B.Tech-Information Technology			CO3	Design and implement a web services application that "discovers" the Data and/or other web services via the semantic web.
	VR17	12	B.Tech-Information			CO4	Discover the capabilities and limitations of semantic web technology for social networks.
49	VR17	12	B.Tech-Information	1012173204	BIOMETRIC SYSTEMS	CO1	Identify the various Biometric technologies applied in different domains
	VR17	12	B.Tech-Information			CO2	Interpret the need of biometric in the computing environment and society
	VR17	12	B.Tech-Information			CO3	Design and develop of biometric recognition system for the organization.
	VR17	12	B.Tech-Information			CO4	Develop simple applications for privacy.
50	VR17	12	B.Tech-Information	1012173205	NEURAL NETWORKS	CO1	Prepare the technical potential of the learning and self organizing systems.
	VR17	12	B.Tech-Information			CO2	Validating assumptions and derivations behind ANN algorithms in real world applications
	VR17	12	B.Tech-Information			CO3	Learn and evaluate analysis of linear auto associative FF Networks
	VR17	12	B.Tech-Information			CO4	Apply applications of Artificial Neural Networks to real world applications
51	VR17	12	B.Tech-Information	1012173206	OPERATION RESEARCH	CO1	Implementing the methodology of Operations Research for various models.
	VR17	12	B.Tech-Information Technology			CO2	Understand and apply Linear programming methods, duality, and sensitivity analysis for various applications
	VR17	12	B.Tech-Information			CO3	Apply Multi-criteria decision techniques for transport models
	VR17	12	B.Tech-Information			CO4	Create decision making under uncertainty and risk.
52	VR17	12	B.Tech-Information	1005173204	ARTIFICIAL INTELLIGENCE	CO1	Identify Methods in AI that may be suited to solve a given problem and Game Playing
	VR17	12	B.Tech-Information			CO2	Demonstrate AI search algorithms and formalizations on real world problems
	VR17	12	B.Tech-Information Technology			CO3	Analyze the basic issues of different types of knowledge representation techniques to build intelligent system
	VR17	12	B.Tech-Information			CO4	Apply probabilistic and fuzzy models to solve problems with uncertainty.
53	VR17	12	B.Tech-Information	1012173207	INTRODUCTION TO DIGITAL SIGNAL PROCESSING	CO1	Design, simulate and realize different digital filters.
	VR17	12	B.Tech-Information Technology			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

	VR17	12	B.Tech-Information		PROCESSING	CO3	Design multi rate digital signal processing system.
	VR17	12	B.Tech-Information			CO4	Evaluating the architecture of DSP processor for various applications
54	VR17	12	B.Tech-Information	1005173205	EMBEDDED SYSTEMS	CO1	Categorize embedded systems and summarize 8051 microcontroller architecture
	VR17	12	B.Tech-Information			CO2	Identify the unique characteristics of real time systems
	VR17	12	B.Tech-Information			CO3	Apply syncronization tools in various real time scenarious
	VR17	12	B.Tech-Information			CO4	Define the unique design problems and challenges of real time systems
55	VR17	12	B.Tech-Information	1003173203	ROBOTICS	CO1	Identify and select various robot configuration and components.
	VR17	12	B.Tech-Information			CO2	Select appropriate actuators and sensors for a robot based on specific application.
	VR17	12	B.Tech-Information			CO3	Carry out kinematic and dynamic analysis for simple serial kinematic chains.
	VR17	12	B.Tech-Information			CO4	Perform trajectory planning for a manipulator by avoiding obstacles
56	VR17	12	B.Tech-Information	1012173221	DATA MINING LAB USING WEKA	CO1	Apply methods and procedures for data cleaning, pre-processing and integration
	VR17	12	B.Tech-Information Technology			CO2	Identify and choose the principle algorithms and techniques used in clustering, association, classification and prediction.
	VR17	12	B.Tech-Information			CO3	Carry out Visualization of datasets using various algorithms
	VR17	12	B.Tech-Information			CO4	Perform Analysis on different datasets setting different parameters.
57	VR17	12	B.Tech-Information	1005173223	WEB TECHNOLOGIES LAB	CO1	Create and design a static web pages using HTML and CSS
	VR17	12	B.Tech-Information Technology			CO2	Design dynamic web applications using JavaScript and explain how XML provides a standard method to access information
	VR17	12	B.Tech-Information			CO3	Demonstrate database connectivity for developing web applications using PHP
	VR17	12	B.Tech-Information			CO4	Create a dynamic, webb based applications using PERL
58	VR17	12	B.Tech-Information	1012173222	SOFTWARE TESTING LAB	CO1	Figure out practical solutions to the problems for various applications
	VR17	12	B.Tech-Information			CO2	Define, formulate and analyze test cases for given problem domain.
	VR17	12	B.Tech-Information			CO3	Manage testplans and testmodels for project from beginning to end.
	VR17	12	B.Tech-Information			CO4	Finding out implementation of different strategies to replace errors.
59	VR17	12	B.Tech-Information	1099173101	IPR AND PATENTS	CO1	Interpret the various aspects of IPR
	VR17	12	B.Tech-Information			CO2	Conclude importance of Copyrights, Trademarks & Trade Secrets
	VR17	12	B.Tech-Information			CO3	Obtain Patent Rights for New Innovations
	VR17	12	B.Tech-Information			CO4	Elaborate on Privacy Issues
60	VR17	12	B.Tech-Information	1005174101	CRYPTOGRAPHY AND NETWORK SECURITY	CO1	Identify basic security attacks and services
	VR17	12	B.Tech-Information			CO2	Analyze the strengths and weaknesses of various symmeteric encryption algorithms.
	VR17	12	B.Tech-Information			CO3	Apply the concepts of number theory and public key algorithms in cryptography
	VR17	12	B.Tech-Information			CO4	Clasify various cryptographic protocols, hash functions, digital signature schemes
61	VR17	12	B.Tech-Information	1012174101	MOBILE COMPUTING	CO1	Analyze, design and develop new mobile application.
	VR17	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).
	VR17	12	B.Tech-Information			CO3	Create a new ad hoc network applications and/or algorithms/protocols.

	VR17	12	B.Tech-Information			CO4	Design and develop any existing or new protocol related to mobile environment
62	VR17	12	B.Tech-Information	1005174103	BIG DATA ANALYTICS	CO1	Analyze Hadoop Architecture
	VR17	12	B.Tech-Information			CO2	Acquire knowledge on Map Reduce Framework and implement various
	VR17	12	B.Tech-Information			CO3	Develop applications using java language and implement programs by making use of hadoop
	VR17	12	B.Tech-Information			CO4	Implement Big data activities using PIG and HIVE.
63	VR17	12	B.Tech-Information	1099172106	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	CO1	Describe the economic activities performed by the businessmen in the business for profit
	VR17	12	B.Tech-Information			CO2	Evaluate the production theories and pricing policies of various enterprises
	VR17	12	B.Tech-Information			CO3	Understand the significance of demand, its analysis, measurement of demand and its
	VR17	12	B.Tech-Information			CO4	Evaluate investment proposals using capital budgeting tools and techniques.
64	VR17	12	B.Tech-Information	1012174102	ADVANCED OPERATING SYSTEMS ADVANCED OPERATING SYSTEMS	CO1	Develop applied methods in building architecture for communication in distributed
	VR17	12	B.Tech-Information			CO2	Apply range of techniques available for increasing system security
	VR17	12	B.Tech-Information			CO3	Outline the potential benefits of distributed systems
	VR17	12	B.Tech-Information Technology			CO4	Summarize the major security issues associated with distributed systems along with the range of techniques available for increasing system
65	VR17	12	B.Tech-Information	1012174103	INFORMATION RETRIEVAL SYSTEMS	CO1	Identify the analysis tools as they apply to information retrieval systems
	VR17	12	B.Tech-Information Technology			CO2	formulate the problems to be solved in current IR systems and describes the advantages of current IR systems
	VR17	12	B.Tech-Information			CO3	Analyzing various strategies and methods of representing and retrieving documents.
	VR17	12	B.Tech-Information			CO4	using various tools building datamodels for linking, describing and searching the web.
66	VR17	12	B.Tech-Information	1004174105	IoT & ITS APPLICATIONS	CO1	Analyze and formulate the Architecture, protocols and applications of IoT.
	VR17	12	B.Tech-Information			CO2	Analyse and design the communication protocols and standards used in IoT
	VR17	12	B.Tech-Information Technology			CO3	Analyse and design the simple IoT applications to monitor or control IoT devices using simulation or hardware
	VR17	12	B.Tech-Information			CO4	Implement the real time IoT applications.
67	VR17	12	B.Tech-Information	1012174104	MULTIMEDIA PROGRAMMING	CO1	Incorporate various multimedia formats and compression techniques in web applications
	VR17	12	B.Tech-Information			CO2	Merging different types of image formats and audio formats in various applications
	VR17	12	B.Tech-Information			CO3	Apply different video formats and compression techniwues in web interfaces.
	VR17	12	B.Tech-Information			CO4	Gain the knowledge in developing real world multimedia applications
68	VR17	12	B.Tech-Information Technology	1012174105	MANAGEMENT INFORMATION SYSTEMS	CO1	Figure out management strength (i.e., strong points) of the organization, to take advantage of the opportunities available.
	VR17	12	B.Tech-Information Technology			CO2	Build reports on production statistics regarding rejection, defective and spoilage and their effect on costs and quality of the products
	VR17	12	B.Tech-Information Technology			CO3	Create strong protocols to strengthen organization that take advantage of creating new opportunities available.
	VR17	12	B.Tech-Information			CO4	Implement Decision support system at various levels in an organization
69	VR17	12	B.Tech-Information	1005174105	SOFTWARE PROJECT MANAGEMENT	CO1	Infer basic concepts and issues of software project management
	VR17	12	B.Tech-Information			CO2	conduct activities necessary to successfully complete and close the Software projects
	VR17	12	B.Tech-Information			CO3	Estimate the effort required for a software project development and identify software

	VR17	12	B.Tech-Information			CO4	develop the skills for tracking and controlling software deliverables
70	VR17	12	B.Tech-Information Technology	1005174102	MACHINE LEARNING	CO1	Recognize the characteristics of machine learning and differentiate machine learning algorithms into supervised,unsupervised and
	VR17	12	B.Tech-Information			CO2	Solve classification problems using concept learning and decision trees
	VR17	12	B.Tech-Information			CO3	Importance of Dimensonal Reductiuon and vector machine algorithms
	VR17	12	B.Tech-Information			CO4	Identify the concept behind neural networks for learning non-linear functions
71	VR17	12	B.Tech-Information	1012174106	DECISION SUPPORT SYSTEM	CO1	Understand the relationship between business information needs and decision making
	VR17	12	B.Tech-Information			CO2	Apply the general nature and range of decision support system algorithms
	VR17	12	B.Tech-Information			CO3	Appraise issues related to the development of DSS
	VR17	12	B.Tech-Information			CO4	Create appropriate modelling techniques
72	VR17	12	B.Tech-Information	1005174121	CRYPTOGRAPHY AND NETWORK SECURITY LAB	CO1	Evaluate different encryption algorithms on number theory
	VR17	12	B.Tech-Information			CO2	Implement Symmetric cryptographic algorithms
	VR17	12	B.Tech-Information			CO3	Implement Asymmetric cryptographic algorithms
	VR17	12	B.Tech-Information			CO4	Execute Various Cryptographic Hash algorithms
73	VR17	12	B.Tech-Information	1005174122	BIGDATA ANALYTICS LAB	CO1	Implement programs by making use of Hadoop i/o.
	VR17	12	B.Tech-Information			CO2	Apply data modeling techniques to large data sets
	VR17	12	B.Tech-Information			CO3	Create applications for Big Data analytics
	VR17	12	B.Tech-Information			CO4	Develop Map Reduce programs to solve real world problems which deals with big data.
74	VR17	12	B.Tech-Information	1005174203	DISTRIBUTED SYSTEMS	CO1	Illustrate the basic elements and concepts related to distributed system technologies
	VR17	12	B.Tech-Information			CO2	Tell the characteristics of distributed systems for designing architectural models
	VR17	12	B.Tech-Information Technology			CO3	Enumerate the features and applications of important standard protocols which are used in the distributed system
	VR17	12	B.Tech-Information			CO4	Interpret inter-process communication in a distributed system
75	VR17	12	B.Tech-Information	1005174106	CLOUD COMPUTING	CO1	apply the knowledge of cloud technology to demonstrate the working principles of cloud
	VR17	12	B.Tech-Information			CO2	analyse cloud services extended by various cloud providers to build a cloud
	VR17	12	B.Tech-Information			CO3	Identify emerging cloud programming paradigms and its software environments
	VR17	12	B.Tech-Information			CO4	Design and develop the backup strategies for cloud data based on features.
76	VR17	12	B.Tech-Information Technology	1099172203	MANAGEMENT SCIENCE	CO1	Gives an outline of management and its nature scope and functions and hierarchical levels and organizational structure and managing the
	VR17	12	B.Tech-Information			CO2	Bring out various concepts of strategic management and project management
	VR17	12	B.Tech-Information Technology			CO3	Elucidate the process of matching manager qualifications with position requirements and concept of marketing mix
	VR17	12	B.Tech-Information			CO4	Able to understand the various functions of production and inventory management
77	VR17	12	B.Tech-Information Technology	1005174205	CONCURRENT AND PARALLEL PROGRAMMING	CO1	Build, revise and execute concurrent and parallel algorithms. architectures and illustrating the work to avoid race condition.
	VR17	12	B.Tech-Information Technology			CO2	Interpret the working of multi processor, multi core architectures and illustrating the work to avoid race condition.
	VR17	12	B.Tech-Information			CO3	solve problems requiring both semaphores and events as part of the solution

	VR17	12	B.Tech-Information Technology			CO4	Implement different server architectures (topologies), e.g. client server, peer-to-peer,agent systems, grid architectures
78	VR17	12	B.Tech-Information Technology	1012174201	CYBER SECURITY	CO1	Identifying System and application security threats and vulnerabilities using Cyber Security architecture principles
	VR17	12	B.Tech-Information Technology			CO2	Apply appropriate response headers by identifying different classes of attacks and Cyber Security incidents.
	VR17	12	B.Tech-Information			CO3	Project and describe various risk management processes and practices in a network
	VR17	12	B.Tech-Information			CO4	Evaluation of decision making outcomes of Cyber Security scenarios
79	VR17	12	B.Tech-Information	1005174201	FUNDAMENTALS OF BLOCKCHAIN TECHNOLOGY	CO1	Choose functional/operational aspects of crypto currency ecosystem.
	VR17	12	B.Tech-Information			CO2	Make use of emerging abstract models for Blockchain Technology
	VR17	12	B.Tech-Information Technology			CO3	Identify major research challenges and technical gaps existing in between theory and practice in cryptocurrency domain.
	VR17	12	B.Tech-Information			CO4	Build fundamental characteristics of block chain using bit coin.
80	VR17	12	B.Tech-Information	1012174202	SOFTWARE QUALITY ASSURANCE	CO1	Apply different approaches of testing software applications
	VR17	12	B.Tech-Information			CO2	Analyze specifications and identify appropriate test generation strategies
	VR17	12	B.Tech-Information			CO3	Develop an appropriate test design for a given test object
	VR17	12	B.Tech-Information			CO4	Figure out different strategies and procedure to replace errors for an application.
81	VR17	12	B.Tech-Information	1012174281	INTERNSHIP	CO1	Apply domain knowledge during the course of internship.
	VR17	12	B.Tech-Information			CO2	Develop/implement the solutions with appropriate techniques, resources and
	VR17	12	B.Tech-Information Technology			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.
	VR17	12	B.Tech-Information Technology			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
82	VR17	12	B.Tech-Information Technology	1012174261	COMPREHENSIVE VIVA	CO1	Analyze a complex computing problem and to apply principles of computing and relevant disciplines to identify solutions
	VR17	12	B.Tech-Information Technology			CO2	Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline
	VR17	12	B.Tech-Information Technology			CO3	Apply computer science theory and software development fundamentals to produce computing-based solutions.
	VR17	12	B.Tech-Information Technology			CO4	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
83	VR17	12	B.Tech-Information Technology	1012174251	TECHNICAL SEMINAR	CO1	Identify and understand assumptions, theses, and arguments that exist in the work of authors.
	VR17	12	B.Tech-Information			CO2	Extend intellectual discovery and unravel complexities of thought.
	VR17	12	B.Tech-Information Technology			CO3	Evaluate initial hypotheses in light of evidence and collaborative discussion with the goal of making considered judgments.
	VR17	12	B.Tech-Information			CO4	Improve reflective listening and inclusive, respectful conversation
	VR17	12	B.Tech-Information Technology			CO1	Analyze a complex computing problem and to apply software engineer principles in design and

84	VR17	12	B.Tech-Information Technology	1012174231	PROJECT	CO2	Investigate and develop computing-based solution using mordern tools that help in sustaining environment and society.
	VR17	12	B.Tech-Information Technology			CO3	Use formal and informal discussions with team members and guide, make presentations and prepare technical document.
	VR17	12	B.Tech-Information Technology			CO4	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

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

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY(A)							
B.TECH. ELECTRONICS AND COMMUNICATION 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	VR17	04	B.Tech-Electronics and Communication Engineering	1000171101	ENGLISH-1	CO1	Enhance English Language by relating the ideas of eminent personalities.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Articulate the technological advancements fluently.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Inculcate the art of thinking and writing clearly and logically.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Enact various themes through team work and learn the usage of vocabulary through humourous texts.
	VR17	04	B.Tech-Electronics and Communication Engineering	1000171102	Engineering Mathematics-I	CO1	Solve the first and higher order linear differential equations.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Estimate extrema and series expansions of functions of several variables.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Interpret area and volume using double integral and triple integral.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Evaluate of solution of Ordinary differential equations by using Laplace Transform technique.
3	VR17	04	B.Tech-Electronics and Communication Engineering	1000171103	Engineering Mathematics-II	CO1	Estimate numerical solution of non Linear equation.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Construct Interpolating polynomial for the given data.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Calculate Numerical Solution of ODE and Numerical Integration.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Evaluate Fourier series and Fourier transforms for functions.
4	VR17	04	B.Tech-Electronics and Communication Engineering	1000171105	Computer Programming using C	CO1	interpret fundamentals of computers and convert flowcharts/algorithms to C Programs, compile and debug programs
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply decision making and Iterative feature of C Programming language effectively.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	design and implement programs to analyze the different pointer applications
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Apply structures and unions and Implement file Operations in C programming for any given application
5	VR17	04	B.Tech-Electronics and Communication Engineering	1000171106	Engineering Drawing	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply the principle of orthographic projections to draw Orthographic projections of points, lines.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Construct the various types of planes and solids its views in different Positions
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Develop isometric views of simple objects

6	VR17	04	B.Tech-Electronics and Communication Engineering	1000171111	**Applied Chemistry**	CO1	Identify different polymers and their Engineering applications.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Desribe various renwable and non- renwable energy resources.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Aquire the knoweldge of mechanism and principles measures of corrosion.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Illustrate green Synthesis,semi conductors, super conductors and their applications in industry .
7	VR17	04	B.Tech-Electronics and Communication Engineering	1000171121	**English-Communication Skills Laboratory-I**	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Articulate with others by using proper functions.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Enact the roles with proper body language.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Communicate fluently with proper pronunciation
8	VR17	04	B.Tech-Electronics and Communication Engineering	1000171124	**IT Workshop**	CO1	Understand the basic components and peripherals of a computer.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Familiar in configuring a system.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Learn the usage of productivity tools.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Acquire knowledge about the netiquette and cyber hygiene.
9	VR17	04	B.Tech-Electronics and Communication Engineering	1000171128	**Computer Programming Lab**	CO1	analyze a given c program to identify bugs and write the appropriate code.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply decision making and Iterative feature of C Programming language to implement them effectively.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Build programs using functions ,arrays and pointers.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Develop a c program for implementing user defined data types and implement file handling mechanisms.
10	VR17	04	B.Tech-Electronics and Communication Engineering	1000171201	**ENGLISH-II**	CO1	Develop communication skills by inferring the technological advancements.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Identify the life of eminent personalities.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Relate the importance of Environment and its sustainability to language learning
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Create the art of writing by applying apt vocabulary and grammar.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO1	Solve simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix.

11	VR17	04	B.Tech-Electronics and Communication Engineering	1000171203	**Engineering Mathematics-III**	CO2	Identify and solve partial differential equations.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Calculate gradient of a scalar function, divergence and curl of a vector function.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Evaluate line, surface and volume integrals using appropriate integral theorems.
12	VR17	04	B.Tech-Electronics and Communication Engineering	1000171207	**Applied Physics**	CO1	Describe the wave phenomena of light and working principle of optical instruments.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply the knowledge of basic quantum mechanics to understand wave equation.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Understanding the basic knowledge of free electon theory of materials.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Make use of the basic concepts of energy bands in crystalline solids to understand semiconductor physics.
13	VR17	04	B.Tech-Electronics and Communication Engineering	1000171209	**Network Analysis**	CO1	Analyze the RLC circuit's behavior in detailed.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Analyze the performance of periodic waveforms.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, h &g).
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Analyze the filter design concepts in real world applications.
14	VR17	04	B.Tech-Electronics and Communication Engineering	1000171212	**ENVIRONMENTAL STUDIES**	CO1	Elucidate the natural resource & their importance for the sustenance of life and recognises the need to conserve natural resource
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Gives the broad view on the various attributes of pollution & and their impact & measure to reduce he pollution along with waste management
	VR17	04	B.Tech-Electronics and Communication 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
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Educates about Environmental Impact Assessment, Environmental Impact Statement & Environmental Audit
15	VR17	04	B.Tech-Electronics and Communication Engineering	1000171213	**Data Structures**	CO1	Relate data structure concepts with real time applications.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply linear and non linear data structures by identifying the appropriate need.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	analyze searching and sorting techniques for effective management of data
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Design and implement operations of linear and nonlinear data structures
16	VR17	04	B.Tech-Electronics and Communication Engineering	1000171221	**English Communicati**	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Articulate with others by using proper functions.

16	VR17	04	B.Tech-Electronics and Communication Engineering	1000171221	on Skills Lab-2	CO3	Enact the roles with proper body language.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Communicate fluently with proper pronunciation
17	VR17	04	B.Tech-Electronics and Communication Engineering	1000171222	Engineering Physics Laboratory	CO1	Experimentation of laws of vibrations in strenteched string
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Determination of velocity of sound, rigidity modulus of a wire, acceleration due to gravity, radius of gyration and Planck's constant.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyze the voltage vs. current characteristics of Zener diode and temperature vs. resistance characteristics of a thermistor
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Demonstration of formation Newton's rings, diffraction pattern using grating and induced magnetic field in a cirucuclar coil
18	VR17	04	B.Tech-Electronics and Communication Engineering	1000171228	Data Structures Programming Lab	CO1	Develop skills to design and analyze simple linear and non linear data structures
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Identify and apply the suitable data structure for the given real world problem
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Implement programs on linear datastructures.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Perform basic operations on trees.
19	VR17	04	B.Tech-Electronics and Communication Engineering	1004172101	Electronic Devices and Circuits	CO1	Explain the basic concepts of semiconductor physics and summarize the characteristics of PN junction diode in different modes of operation.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Compare the construction, working principle of rectifiers, with and without filters with relevant expressions and necessary comparisons.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Evaluate 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.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Eestimate the stabilization concepts with expressions and perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.
20	VR17	04	B.Tech-Electronics and Communication Engineering	1004172102	Switching Theory and Logic Design	CO1	Convert numeric information in different Number systems.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Solve the simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Design and Implement sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.
21	VR17	04	B.Tech-Electronics and Communication Engineering	1004172103	Signals and Systems	CO1	Analyze the different signals spectral characteristics of continuous-time periodic and a periodic signals using Fourier analysis.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Explain the process of sampling and the effects of under sampling,over sampling.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Evaluatae convolution both in time domain and frequency domain.

	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Interpret the Laplace transform and Z- transform for analysis of continuous-time and discrete-time signals and systems.
22	VR17	04	B.Tech-Electronics and Communication Engineering	1004172104	Electrical Technology	CO1	Demonstrate the operation of DC generator, DC motor and analyze the characteristics of DC generator.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Develop equivalent circuit and evaluate performance of transformers
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Illustrate the Principle of operation of Induction motor and Synchronous machine and also explain the speed-torque characteristics and starting methods of induction motor
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Analyze various Electrical Measuring instruments like Ammeter, Voltmeter, Wattmeter
23	VR17	04	B.Tech-Electronics and Communication Engineering	1004172105	Random Variables and Stochastic Process	CO1	Determine the Probability distribution and density functions for single and multiple random variables
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Evaluate Mean and variances of random signals.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Examine autocorrelation function of random process and develop the relationship between power density spectrum and auto correlation.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Estimate the noise in the communication channels
24	VR17	04	B.Tech-Electronics and Communication Engineering	1004172106	Mathematics-IV	CO1	Find derivatives of complex functions and solutions for special functions
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Understand the analyticity, potential fields, residues and poles of complex potentials in field theory and electromagnetic theory.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Solve for mean and variance for given samples, To apply basic probability techniques and models to analyze the performance of computer systems, and, in particular, of networks and queues
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Expose the basic characteristic features of a queuing system and acquire skills in analyzing queuing models.
25	VR17	04	B.Tech-Electronics and Communication Engineering	1004172121	Electronic Devices and Circuits Lab	CO1	Determine the V-I characteristics of zener diode, PN junction diode and its applications such as Half wave Rectifier and Full Wave Rectifier .
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Analyze the Input and Output characteristics of BJT in CE, CC configurations and design the CE amplifier and CC amplifier.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Estimate the characteristics of FET & design the CS amplifier.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Examine the characteristics of SCR and UJT.
26	VR17	04	B.Tech-Electronics and Communication Engineering	1004172122	Networks & Electrical Technology Lab	CO1	Determine resonance frequency, Q-factor of RLC network and to analysis time response of first orders RC/RL network for non-sinusoidal inputs.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Estimate parameters of two port networks and to understand the concept network theorems in network reduction of electrical networks.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Determine efficiency of dc shunt machine with actual loading and analyses performance of 3 phase induction motor

	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Illustrate the significance of regulation of an alternators through synchronous impedance method.
27	VR17	04	B.Tech-Electronics and Communication Engineering	1004172201	Electronic Circuit Analysis	CO1	Explain classification of amplifiers and analyze the CE, CB, CC amplifiers using small signal hybrid model and derive the voltage gain, current gain, input impedance and output impedance
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Design and analyze the cascaded RC coupled BJT amplifier and MOS Amplifier and different types of the coupled amplifiers
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyze the different types of feedback amplifiers and oscillators
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Develop different types of power amplifiers and learn the effects of cascading on single, double tuned amplifiers.
28	VR17	04	B.Tech-Electronics and Communication Engineering	1004172202	Control Systems	CO1	Understand the concepts of feedback and its advantages to various control systems
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Analyze the transfer function characteristics of the given different order system and introducing various approaches to reduce the overall system complexity
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Applying different approches for absolute stability and relative stability criteria.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Evaluating the system performance in non zero input conditions.
29	VR17	04	B.Tech-Electronics and Communication Engineering	1004172203	Electromagnetic Waves and Transmission Lines	CO1	Contrast the electric field and magnetic fields, analyze the Maxwell's Equations for static and time varying field
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Determine the EM wave equation and charaterize the propagation of EM wave through conductor and dielectric medium.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Modelling the transmission line using the basic circuit elements.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Justification of smith chart to find the impedance mismatching and measurement of VSWR.
30	VR17	04	B.Tech-Electronics and Communication Engineering	1004172204	Analog Communications	CO1	Differentiate various Analog modulation and demodulation schemes and their spectral characteristics
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Analyze noise characteristics of various analog modulation methods
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Examine various functional blocks of radio transmitters and receivers
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Design simple analog systems for various modulation techniques.
31	VR17	04	B.Tech-Electronics and Communication Engineering	1004172205	Pulse and Digital Circuits	CO1	Design linear and non-linear wave shaping circuits
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Analyse various wave shaping circuits and signal generating circuits
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Examine the difference between multi vibrators and time base generators
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Evaluate different non sinusoidal signals generators and its use in experimental research areas

32	VR17	04	B.Tech-Electronics and Communication Engineering	1099172207	Engineering Economics and Management Science	CO1	Discuss the concepts of managerial economics like Demand, Law of Demand, Determinants of demand and demand forecasting techniques
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Make use of production functions of different variables
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Evaluate various forms of business organizations
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Construct network diagram and solve problems of PERT and CPM
33	VR17	04	B.Tech-Electronics and Communication Engineering	1004172221	Electronic Circuit Analysis Lab	CO1	Interpret different types of negative feedback amplifiers.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Develop different types of oscillators.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Design different types of multistage amplifiers.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Estimate the different types of power and tuned amplifiers.
34	VR17	04	B.Tech-Electronics and Communication Engineering	1004172222	Analog Communicatio ns Lab	CO1	Generate,detect and analyze different analog modulation schemes.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Evaluate the various measures that improve receiver performance.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Demonstate various pulse modulation schemes.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Develop the programming aspects of MATLAB in simulating various analog modulation techniques.
35	VR17	04	B.Tech-Electronics and Communication Engineering	1004172231	Industrial visit	CO1	Apply fundamental principles of engineering
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Communicate fluently and effeciently
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Interact and follow engineering ethics and discipline in industry
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Develop professional work reports,presentations and learn Project management.
36	VR17	04	B.Tech-Electronics and Communication Engineering	**1004173101**	Linear IC Applications	CO1	Demonstrate basic operation and characteristics of op-amp.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Interpret different linear and non-linear applications of Op-Amp.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Design & analyze different types of active filters using Op-Amp.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Compare different types of ADC and DACs
	VR17	04	B.Tech-Electronics and Communication Engineering			CO1	Compare different digital carrier modulation and demodulation schemes.

37	VR17	04	B.Tech-Electronics and Communication Engineering	1004173102	Digital Communications	CO2	Evaluate digital modulation techniques for optimal reception.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Apply various errors correction and detection codes to digital data.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Evaluate the error probability calculations for digital modulation techniques .
38	VR17	04	B.Tech-Electronics and Communication Engineering	1004173103	Computer Architecture and Organization	CO1	Analyze the Performance of a computer using performance equation
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Understand the different instruction types and calculate the effective address of an operand by addressing modes.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Demonstrate how a computer performs micro arithmetic operation.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Evaluate how the data transfer takes place using I/O mode, Interrupt, and DMA techniques with interfacing devices and data storage concepts.
39	VR17	04	B.Tech-Electronics and Communication Engineering	1004173104	Digital IC Applications	CO1	Understand the structure of commercially available digital integrated circuit families
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Learn the IEEE Standard 1076 Hardware Description Language (VHDL)
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Model complex digital systems at several levels of abstractions, behavioural, structural, simulation, synthesis and rapid system prototyping
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Analyze and design basic digital circuits with combinatorial and sequential logic circuits using VHDL
40	VR17	04	B.Tech-Electronics and Communication Engineering	1004173105	Antennas and Wave Propagation	CO1	Classify the fundamental characteristics of antennas (gain, bandwidth, directivity etc.) in order to compute a wireless communication link.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Analyze different antenna arrays and patterns
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Design the different antennas and thier properties
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Illustate the mechanism of the atmospheric effects on radio wave propagation
41	VR17	04	B.Tech-Electronics and Communication Engineering	1004173121	Integrated Circuits/Pulse and digital circuits Lab	CO1	Analyze the Linear and Non Linear waveshaping of RC Circuits
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Interpret the different types of filter responses with operational amplifier and RC Circuits.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Design an oscillators using op-amp
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Evaluate the Non Linear applications of Transistor, Op-amp and 555 timer.
42	VR17	04	B.Tech-Electronics and Communication Engineering	1004173122	Digital Communicatio	CO1	Apply time division multiplexing concepts in different pulse modulation techniques.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Analyze different pulse digital modulation techniques.

42	VR17	04	B.Tech-Electronics and Communication Engineering	1004173122	Communications Lab	CO3	Design and implement different digital modulation techniques and interpret the modulated and demodulated waveforms.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Identify and describe various encoding and decoding techniques.
43	VR17	04	B.Tech-Electronics and Communication Engineering	1004173123	Digital IC Applications Lab	CO1	Implement design logic with Xilinx software on to FPGA hardware
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Simulate and synthesize circuit design using Xilinx Vivado software
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Design sequential logic circuits in VHDL, simulate and synthesize design using Xilinx Vivado software
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Compare and perform prelayout and post layout simulation and program the FPGA hardware.
	VR17	04	B.Tech-Electronics and Communication Engineering	1099172103	Professional Ethics & Human Values	CO1	Discuss the importance of human values, harmony and ethical behavior in real life situations
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Describe the core values that shape the ethical behaviour of an engineer
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Recall basics of professional ethics and human values.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Develop sustained happiness through identifying the essentials of human values and skills.
45	VR17	04	B.Tech-Electronics and Communication Engineering	1004173201	Microprocessors and Microcontrollers	CO1	Understand the concepts of architecture, memory organization of Intel 8086 microprocessor and ARM and Intel 8051 microcontrollers.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Demonstrate the concepts of addressing modes, instruction set of Intel 8086 microprocessor and Intel 8051 and ARM processor
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Write assembly language programs for simple problem statements
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Design an interface between peripheral chips & processors and write programs for data transfer
46	VR17	04	B.Tech-Electronics and Communication Engineering	1004173202	Communication Networks	CO1	Interpret ISO-OSI and TCP/IP models and various Network topology models
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Illustrate the concept of data framing and error control mechanisms
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Compare different types of routing protocols
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Familiar with the World Wide Web concept
47	VR17	04	B.Tech-Electronics and Communication Engineering	1004173203	VLSI design	CO1	Compare the fabrication process for MOS,CMOS and BICMOS technologies along with their electrical properties.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Explain the concepts of design rules during the layout design.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Estimate various scaling Models and factors and their effects on MOSFET parameters.

	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Evaluate various design issues of VLSI Circuits and illustrate FPGA Design.
48	VR17	04	B.Tech-Electronics and Communication Engineering	1004173204	Digital Signal Processing	CO1	Analyse the digital signals using various digital transforms DFT, FFT etc.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Design and realize various digital filters for digital signal processing
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Evaluate the different multi rate digital signal processing systems.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Illustrate the architecture of DSP processor
49	VR17	04	B.Tech-Electronics and Communication Engineering	1004173206	Introduction to Data Base 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.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression from queries.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Intrepret the use of normalization and functional dependency, indexing and hashing technique used in database design.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Apply and relate the concept of transaction, concurrency control and recovery in database.
50	VR17	04	B.Tech-Electronics and Communication Engineering	1005173207	Introduction to Python Programming	CO1	Install Python IDE and run basic Python scripts.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Illustrate different operators, functions, key Concepts of Object Oriented Programming in python.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Perform coding of complex designs by importing packages and modules
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Develop front end GUI using Visualization Libraries and Multithreading techniques.
51	VR17	04	B.Tech-Electronics and Communication Engineering	1005173208	JAVA Programming	CO1	Identify the concepts and features of object oriented programming in Java.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Describe and implement the programs with command line arguments and Scanner Class.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyze and implement the concepts of Inheritances and Multithreading with real world scenario.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Develop GUI programs using Applets and Event Handling.
52	VR17	04	B.Tech-Electronics and Communication Engineering	1004173205	Soft Comuting Techniques	CO1	Summarize soft computing techniques and their applications
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Analyze various neural network architectures
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Contrast perceptrons and counter propagation networks.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Asses different genetic algorithms and their applications.

53	VR17	04	B.Tech-Electronics and Communication Engineering	1004173206	Bio medical Instrumentation	CO1	Identify Man instrument system and types of electrodes and transducers to extract bio potential signals
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Summarise Anatomy of heart, lungs, eye and ears. Devices to do tests on heart, lungs, eye and ears.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Identify and Monitor the health of patient in intensive care unit
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Illustrate Monitors, recorders and apply electrical accident prevention methods
54	VR17	04	B.Tech-Electronics and Communication Engineering	1004173291	MOOCs	CO1	Connect openly on a global scale, with global learners and Instructors
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Develop high quality learning using multimedia platform
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Self assesment of their performance and learning process.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Adapt a life long learning culture and updating the knowledge according with emerging trends
55	VR17	04	B.Tech-Electronics and Communication Engineering	1004173221	Microprocessors and Microcontrollers Lab	CO1	Develop the necessary Algorithm and Assembly Language Program for the arithmetic and logical operations .
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Identify various interfacing cards and perform 8086 interfacing with different peripherals and implement Programs.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Implement different data transfer techniques with 8051 microcontroller.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Design a microcontroller interfacing circuits for simple applications
56	VR17	04	B.Tech-Electronics and Communication Engineering	1004173222	VLSI Lab	CO1	Design the CMOS circuits for various combinational and sequential logic circuits using the mentor graphics tool.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Estimate the Back end layout design of various circuits and analyse it interms of area, power and delay.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Explain the difference between layout and schematic using LVS tool.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Formulate various designs and verify the waveforms using eldo simulator tool.
57	VR17	04	B.Tech-Electronics and Communication Engineering	1004173223	Digital Signal Processing Lab	CO1	Outline different signals and their operations.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Examine Discrete Fourier Transform (DFT) and Inverse Discrete Fourier Transform (IDFT) of a sequence
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Estimate different digital filters.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Estimate Frequency Response Analysis of filter using window techniques.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO1	Summarise the concepts, characteristics, principles and operation of cellular systems

58	VR17	04	B.Tech-Electronics and Communication Engineering	1004174101	Cellular and Mobile Communications	CO2	Apply Concepts, principles to Co-channel interference Reduction factor, Desired C/I, directional Antenna system and Cell splitting.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyse Point to point model, other cell coverage of signal and traffic, frequency and channel assignment strategies.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Compare concepts of handoff and architectures of GSM, Technology comparison of 3G, 4G and 5G cellular systems.
59	VR17	04	B.Tech-Electronics and Communication Engineering	**1004174102**	Digital Image Processing	CO1	Examine the fundamentals of gray scale and color image processing.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply different transforms and compression methods on image for image processing applications.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyze the methods to extract information from the image in terms of spatial filtering, frequency filtering, restoration and segmentation.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Validate the different techniques of color and multi resolution processing.
60	VR17	04	B.Tech-Electronics and Communication Engineering	**1004174103**	Microwave Engineering	CO1	Analyze the different modes of rectangular and circular waveguides
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Examine different microwave components and discuss different type of coupling mechanism
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Understand the working principles of microwave tube
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Compare the microwave solid state device
61	VR17	04	B.Tech-Electronics and Communication Engineering	**1004174104**	Optical Communications	CO1	Predict necessary components required in modern optical communications systems and summarize fiber characteristics
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Determine electromagnetic modes in waveguides, various losses in an optical system, dispersion of optical fibers.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyze optical fiber and light wave systems using different types of photo detectors and optical test equipments.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Design, build, and demonstrate optical fiber communication system with budget analysis and performance characteristics.
62	VR17	04	B.Tech-Electronics and Communication Engineering	1004174105	IoT & its Applications	CO1	Contrast the Architecture, protocols and applications of IoT.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Analyse the communication protocols and standards used in Io
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Design the simple IoT applications to monitor or control IoT devices using simulation or hardware
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Implement the real time IoT applications.
63	VR17	04	B.Tech-Electronics and Communication Engineering	1004174106	System Design through	CO1	Describe the logic of Digital Circuits using Verilog hardware description language
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Capture the design of digital systems at highest level of abstractions like behavioural modelling

63	VR17	04	B.Tech-Electronics and Communication Engineering	1004174106	through Verilog	CO3	construct the complex digital systems at lower levels of abstractions like Dataflow and switch level
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Analyze and design basic digital circuits with combinatorial and sequential logic circuits using Verilog
64	VR17	04	B.Tech-Electronics and Communication Engineering	1004174107	Embedded Systems Design	CO1	Develop the basic concepts and hardware components of an embedded system and able to know the design approach to perform a specific function.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Explain hardware components required for an embedded system design.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Design various embedded firmware design approaches on embedded environment.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Justify how to integrate hardware and firmware of an embedded system using real time operating system.
65	VR17	04	B.Tech-Electronics and Communication Engineering	1004174108	Global Positioning System(GPS)	CO1	Summarize the concepts, developments of block type GPS Satellites, principles and operation of GPS and Determining the receiver position in 2D, 3D Plane.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply Concepts, principles to GPS velocity calculations and Geo-augmented navigation (GAGAN) architecture.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Asses geometric, covariance analysis, and GPS/INS integration architectures.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Analyse Observation data and navigation message data parameters.
66	VR17	04	B.Tech-Electronics and Communication Engineering	1004174109	Artificial Intelligence	CO1	Identify Methods in AI that may be suited to solve a given problem and Game Playing
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Demonstrate AI search algorithms and formalizations on real world problems
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyze the basic issues of different types of knowledge representation techniques to build intelligent system
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Apply probabilistic and fuzzy models to solve problems with uncertainty.
67	VR17	04	B.Tech-Electronics and Communication Engineering	1004174110	Speech Processing	CO1	Explain the Field of Artificial Intelligence from general AI to self-driving cars.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Analysis and synthesis of speech using different technologies, explain how they work, and discuss their strengths and limitations.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Illustrate the working principles of Tube type Microwave sources and its applications and advantages.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	summarize the applications of different Speech methods (TTS, ASR and spoken language acquisition)
68	VR17	04	B.Tech-Electronics and Communication Engineering	1004174111	Micro Electromechanical Systems (MEMS	CO1	Interpret the role of miniaturization in microelectronic devices and scaling rules of MEMS.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Articulate the techniques for building the microelectronic devices on various types materials.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Deduce the Microsystems technology for technical feasibility.

	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Design MEMS based micro systems and micro devices.
69	VR17	04	B.Tech-Electronics and Communication Engineering	1005172206	Operating Systems	CO1	Summarize the mechanism of OS to handle process and threads and their communication
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Demonstrate OS architecture, mutual exclusion algorithms, deadlock detection algorithms.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Describe the components and aspects of concurrency management
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Examine the mechanism involved in memory management in contemporary OS.
70	VR17	04	B.Tech-Electronics and Communication Engineering	1004174121	Microwave engineering & Optical Communicatio ns Lab	CO1	Examine the characteristics of Microwave sources ,directional couplers and optical devices.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Evaluate different microwave parameters with respect to microwave sources.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Determine the optical loss characteristics and optical source and detectors in optical fibers
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Measure data rate , numerical aperture and losses in optical link
71	VR17	04	B.Tech-Electronics and Communication Engineering	1004174122	Digital Image Processing Lab	CO1	Examine the fundamentals of gray scale and color image processing.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply different transforms and compression methods on image for image processing applications.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyze the methods to extract information from the image in terms of spatial filtering, frequency filtering, restoration and segmentation.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Experiment the different techniques of color and multi resolution processing.
72	VR17	04	B.Tech-Electronics and Communication Engineering	1099173101	IPR & patents	CO1	Evaluate Privacy Issues
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Demonstrate the importance of Copyrights, Trademarks & Trade Secrets
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Apply Patent Rights for New Innovations
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Evaluate Privacy Issues
73	VR17	04	B.Tech-Electronics and Communication Engineering	1004173241	Industry Oriented Mini Project	CO1	Create an Industrial environment and culture within the institution.
	VR17	04	B.Tech-Electronics and Communication 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.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Inculcate innovative thinking and thereby preparing students to help soceity as an engineer
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Develop skill to build design techniques for various problem analysis.

74	VR17	04	B.Tech-Electronics and Communication Engineering	1004174201	Satellite Communications	CO1	Interpret orbital mechanics and launch methodologies
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply Concepts of Attitude and orbit control, telemetry, tracking, Command and monitoring, communication in satellite subsystems.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Design link power budget for satellites
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Compare satellite access techniques
75	VR17	04	B.Tech-Electronics and Communication Engineering	1004174202	Electronic Measurements and Instrumentation	CO1	Compare the fundamentals of static, dynamic characteristics and different errors used in the context of measuring instruments.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Analyze the functions of Oscilloscopes, signal generators, analyzers and Calculate amplitude, frequency and phase of the signals
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Design the Balancing conditions of the bridges to Calculate the unknown values of Resistor, Capacitor and Inductor.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Asscess the performance of different transducers to Measure different parameters such as velocity, humidity, speed, proximity.
76	VR17	04	B.Tech-Electronics and Communication Engineering	**1004174203**	Radar Systems	CO1	Interpret the factors affecting the radar performance using Radar Range Equation.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply the principle of FMCW radar in the design of altimeter.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyze the principle of each and every block of MTI and Tracking Radar
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Demonstrate the basic principle of Receiver and also extraction of signal in Noise
77	VR17	04	B.Tech-Electronics and Communication Engineering	**1004174204**	Data Science	CO1	Judge the significance of exploratory data analysis (EDA) in data science and Apply plots, graphs, summary statistics to carry out EDA and the data science process in a case study.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Apply machine learning algorithms for predictive modelling and Explain why Linear Regression and k-NN are poor choices for Filtering Spam than better Naive Bayes.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyse algorithmic ingredients that constitute a Recommendation Engine, build their own recommendation system using existing components.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Asses the concepts of Data Science, the skill sets needed to be a data scientist and Identify probability distributions for statistical modelling and Fit a model to data.
	VR17	04	B.Tech-Electronics and Communication Engineering	**1004174205**	Low Power VLSI Design	CO1	Examine various sources of power dissipation in VLSI circuit design
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Illustrate different approaches to design a low power circuit
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyze various low power adders and multiplier architectures and extend them to different applications.
78	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Design various low power memories and compare them

79	VR17	04	B.Tech-Electronics and Communication Engineering	1004174206	Wireless Communication and Networking	CO1	Apply communication concepts to solve wireless communications problems.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Summarize existing model's and apply cellular system design concepts, wireless wide area networks for their performance analysis.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Analyse various multiple access schemes used in wireless communications and existing and emerging wireless standards.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Demonstrate wireless local area networks and their specifications. Apply the concepts to orthogonal frequency division multiplexing.
80	VR17	04	B.Tech-Electronics and Communication Engineering	1004174207	Pattern Recognition	CO1	Apply the mathematical foundations for recognition of patterns
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Develop the principles of statistical pattern recognition and apply non parametric techniques in pattern recognition in real time applications
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Demonstrate maximum likelihood and Bayesian parameter estimation for hidden Markov models.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Justify real time applications in image pattern recognition.
81	VR17	04	B.Tech-Electronics and Communication Engineering	1004174281	Internship	CO1	Model the concepts and engineering tools to arrive at design solutions for the identified engineering problem in industry
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Exhibit critical thinking and problem solving skills by analysing underlying issues to challenges
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Solve real life challenges in the workplace by analysing work environment and conditions, and selecting appropriate skill sets acquired from the course
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Articulate career options by considering opportunities in company, sector, industry, professional and educational advancement;
82	VR17	04	B.Tech-Electronics and Communication Engineering	1004174251	Technical Seminar	CO1	Relate literature to formulate problem statements of technology and innovations
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Develop documentation, presentation and communication skills for prefession and personal growth following ethical values
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Identify new directions in Multidisciplinary area
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Assess engineering solution and its applications for Real time problem
83	VR17	04	B.Tech-Electronics and Communication Engineering	1004174261	Comprehensive Viva	CO1	Demonstrate the application of the knowledge acquired in the Electronica and communication domain to solve the problems of the various forms of instituions
	VR17	04	B.Tech-Electronics and Communication Engineering			CO2	Interpret the practical difficulties in applying the various forms of solutions to find the feasible solution.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Solve the real life problems and assess the implications of various forms of solutions.
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Exhibit professional etiquette suitable for career progression and Present their views cogently and precisely
	VR17	04	B.Tech-Electronics and Communication Engineering			CO1	Apply knowledge of Electronics and communication engineering fundamentals to solve the complex Engineering problems

84	VR17	04	B.Tech-Electronics and Communication Engineering	1004174231	Main Project	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
	VR17	04	B.Tech-Electronics and Communication Engineering			CO3	Adapt appropriate techniques, resources and modern engineering tools during the implementation of project
	VR17	04	B.Tech-Electronics and Communication Engineering			CO4	Develop a multidisciplinary project leading to the ability of engagement in lifelong learning and self-development

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

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY(A)							
B.TECH. 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	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171101	ENGLISH-I	CO1	Enhance English Language by relating the ideas of eminent personalities.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Articulate the technological advancements fluently.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Inculcate the art of thinking and writing clearly and logically.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Enact various themes through team work and learn the usage of vocabulary through humourous texts.
2	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171102	MATHEMATICS-1	CO1	Solve the first and higher order linear differential equations.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Estimate extrema and series expansions of functions of several variables.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Interpret area and volume using double integral and triple integral.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Evaluate of solution of Ordinary differential equations by using Laplace Transform technique.
3	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171105	COMPUTER PROGRAMMING USING C	CO1	Write compile and debug Programs in C language
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Use operators, data types and write programs
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Select the best loop construct for a given problem
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design and implement C programs
4	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171106	ENGINEERING DRAWING	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Draw isometric views of simple objects
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Learn the principle of orthographic projections. Draw Orthographic projections of points, lines.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Draw the various types of planes and solids its views in different Positions
5	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171107	APPLIED	CO1	Describe the wave phenomena of light and working principle of optical instruments.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply the knowledge of basic quantum mechanics to understand wave equation.

	VR17	02	B.Tech-Electrical and Electronics Engineering	[illegible]	PHYSICS	CO3	Understanding the basic knowledge of free electon theory of materials.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Make use of the basic concepts of energy bands in crystalline solids to understand semiconductor physics.
6	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171112	ENVIRONMENTAL STUDIES	CO1	Elucidate the natural resource & their importance for the sustenance of life and recognises the need to conserve natural resource
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Gives the broad view on the various attributes of pollution & and their impact & measure to reduce he pollution along with waste management
	VR17	02	B.Tech-Electrical and Electronics 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
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Educates about Environmental Impact Assessment, Environmental Impact Statement & Environmental Audit
7	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171121	ENGLISH COMMUNICATION SKILLS LABORATORY-I	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Articulate with others by using proper functions.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Enact the roles with proper body language.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Communicate fluently with proper pronunciation
8	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171122	ENG PHYSICS LAB	CO1	Experimentation of laws of vibrations in strenteched string
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Determination of velocity of sound, rigidity modulus of a wire, acceleration due to gravity, radius of gyration and Planck's constant.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze the voltage vs. current characteristics of Zener diode and temperature vs. resistance characteristics of a thermistor
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Demonstration of formation Newton's rings, diffraction pattern using grating and induced magnetic field in a cirucuclar coil.
9	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171128	C PROGRAMMING lab	CO1	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Understand and apply the in-built functions and customized functions for solving the problems.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO1	Develop communication skills by inferring the technological advancements.

10	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171201	ENGLISH-II	CO2	Identify the life of eminent personalities.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Relate the importance of Environment and its sustainability to language learning
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Create the art of writing by applying apt vocabulary and grammar.
11	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171202	MATHEMATICS-II	CO1	Estimate numerical solution of non Linear equation.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Construct Interpolating polynomial for the given data.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Calculate Numerical Solution of ODE and Numerical Integration.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Evaluate Fourier series and Fourier transforms for functions.
12	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171203	MATHEMATICS-III	CO1	Solve simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Identify and solve partial differential equations.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Calculate gradient of a scalar function, divergence and curl of a vector function.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Evaluate line, surface and volume integrals using appropriate integral theorems.
13	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171208	Electrical Circuit Analysis - I	CO1	Solve various Electrical networks in the presence of active and passive elements.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Compare Electric and Magnetic Circuits and solve Magnetic circuits with Dot convention
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Illustrate R, L, C networks and solve various networks with AC excitation including Resonance
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze various Electrical networks using Network theorems for both DC and AC excitations.
14	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171211	Applied CHEMISTRY	CO1	Identify different polymers and their Engineering applications.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Desribe various renwable and non- renwable energy resources.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Aquire the knoweldge of mechanism and principles measures of corrosion.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Illustrate green Synthesis,semi conductors, super conductors and their applications in industry .
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO1	Analyze the force systems for equilibrium conditions and able to draw free body diagram.

15	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171216	Engineering Mechanics	CO2	Evaluate the frictional forces between contact surfaces.
	VR17	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
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyse the motion and calculate trajectory characteristics.
16	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171221	ENGLISH COMMUNICATION SKILLS LAB-2	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Articulate with others by using proper functions.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Enact the roles with proper body language.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Communicate fluently with proper pronunciation
17	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171224	ENG workshop	CO1	Study and practice on machine tools and their operations
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiselling carpentry practice
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Apply basic engineering knowledge for carpentry practice
18	VR17	02	B.Tech-Electrical and Electronics Engineering	1000171227	ENGINEERING CHEMISTRYLAB	CO1	Learn and apply basic techniques used in Chemistry laboratory for small/medium scale water analysis.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Estimate the metal ions present in a domestic/industry sample solutions.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Utilize the fundamental laboratory techniques for titrations and synthetic procedures.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze data and gain experimental skills through instrumentation
19	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172101	Electrical circuit analysis-II	CO1	Understand the measurement of three-phase power under balanced and unbalanced load condition.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyze transient response of the electrical networks with DC and AC excitation.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Determine the two port network parameters for different types of electrical networks.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Estimate the different harmonic components from response of a electrical network using Fourier Series and Fourier Transform

20	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172102	ELECTRICAL MACHINES I	CO1	Understand the principles of electromechanical energy conversion, construction and operation of a DC Machines, single phase and polyphase transformers.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyze the characteristics of DC machines and transformers.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Compare the speed control techniques of dc motors and working of starters
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Assess the performance through testing methods of DC machines and transformers
21	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172103	BASIC ELECTRONIC DEVICES & CIRCUITS	CO1	Distinguish the characteristics of different diodes and choose appropriate diode for an application based on the operation
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Explain the operation and design aspects of rectifiers, filters and regulators
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Design different biasing and stabilization circuits and explain compensation techniques for a transistor
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Explain the merits and demerits of positive and negative feedback and the role of feedback in oscillators and amplifiers
22	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172104	ELECTRO MAGNETIC FIELD	CO1	Calculate electric field from various charge distributions and find magnetic field from various current distributions
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Determine polarization in dielectrics, electric current density, and resistance of conductors and also Calculate force in electric and magnetic fields and torque in magnetic fields
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Compute inductance, capacitance of different physical configurations
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Apply Faraday's Law to Find induced Emf.
23	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172105	THERMAL AND HYDRO PRIME MOVERS	CO1	Explain the basic cycles and calculations involved in the operation of steam and gas turbines.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Discuss the operation and performance of reciprocating and centrifugal pumps
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Acquire basic knowledge of turbo machines and describe the working of Pelton, Francis and Kaplan Turbines along with their performance parameters.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Summarize the layout and components in a hydro electric power plant and extend their knowledge to power plant economics with suiatble ethics and calculations
24	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172121	Electrical Machines lab -I	CO1	Build the magnetisation characteristics of a Dc generator.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Determine and predetermine the performance of DC machines and single phase transformer.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Demonstrate to Control the speed of DC motors.

	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Explain the parallel operation of single phase transformer and Scott connection.
25	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172122	ELECTRICAL MACHINES -I LABORATORY	CO1	Analyze the electrical networks with various network theorems
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Illustrate Resonance and Locus diagrams for various R, L, C circuits
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Solve two port network parameters and coeffiecient of coupling for coupled circuit
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Understand the measurement of three phase power under balanced & unbalanced load conditions
26	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172123	HYDRAULIC MACHINERY LAB	CO1	Determine the force exerted by a jet of water on a flat and curved vane
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Compare the performance on various turbines
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze the performance of single and multistage pumps
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Compute slip of a Reciprocating Pump.
27	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172201	ELECTRICAL MACHINES-II	CO1	Compare the construction and operation of induction motors, BLDC motors,SRM, universal motors and sychronous machines
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Interpret the torque producing mechanism,testing methods of induction motors and regulation of synchronous machines
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze various starting methods, pasor diagrams and equivalent circuit of induction motors and synchronous machines
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Evaluate the performance of induction motors and sychronous machines.
28	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172202	CONTROL SYSTEMS	CO1	Derive the transfer function and state space models for electrical,mechanical and electro-mech systems
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyze the Transient & Steady State Performance of a different system.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Determine the stability of different Linear Time Invarient systems.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design lag,lead and lag-lead compensators for different systems to improve system performance.
29	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172203	POWER GENERATION ENGINEERING & ECONOMICS	CO1	Understand the layout of Thermal,Wind, Hydro, Nuclear, Solar, Gas,Geothermal and OTEC power stations.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Examine the operation of power plants and Fuel cells.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Compare and contrast the energy scenario and tariffs in India and the World.

	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design a PV system for given load specifications.
30	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172204	ANALOG ELECTRONIS	CO1	Diagnose and trouble-shoot linear and non-linear electronic circuits.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply the proper semiconductor device depending upon application considering economic and technology upgradation
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze amplifier configurations to obtain the required specifications
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design waveform generators (Astable, Mono stable, Schmitt Trigger) using Single Op-Amp. Study of 555 timer & its applications using Astable and Mono stable Operations.
3	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172205	DATA STRUCTURES	CO1	Understand and construct single, double, and circular linked-lists
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Prepare Stacks and Queues using array and linked-list representations
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Develop programs by using non linear data structures such as trees ,graphs
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design different applications of advanced data structures
32	VR17	02	B.Tech-Electrical and Electronics Engineering	1099172206	MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS	CO1	Analyze the Demand, Price and Cost.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Identify the Nature of different markets to determine Price Output for different Business Units
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Prepare and analyze Financial Statements
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Evaluate investment project proposals
33	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172221	ELECTRICAL MACHINES-II LABORATORY	CO1	Determine the regulation and Xd and Xq values of alternators
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Control the speed and improve the power factor of Induction Motor
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze the equivalent circuit of induction motor
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Assess the performance of induction motor and BLDC motors by conducting various tests
34	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172222	ELECTRONIC DEVICES AND CIRCUITS LABORATORY	CO1	Identify the characteristics of various diodes and select the best diode for a certain application based on the operation.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	To Measure voltage, frequency and phase of any waveform using CRO
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Understand the functioning and features of the transistor CE amplifier

	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze the concepts of BJT, UJT and FET devices
35	VR17	02	B.Tech-Electrical and Electronics Engineering	1002172231	INDUSTRIAL VISIT	CO1	Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to identify solutions
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Design, implement, and evaluate a solution to meet the requirements in the context of the civil engineering program's discipline
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Apply civil engineering fundamentals to produce proper solutions to real world problems.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.
36	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173101	Power transmission Engineering	CO1	Determine sag, tension in transmission lines and differentiate overhead line insulators.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Understand various parameters of transmission lines and underground cables.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyse the factors affecting the performance of transmission lines.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Evaluate performance of long transmission lines and power system transients.
37	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173102	Signals and Systems	CO1	Characterize the signals and systems and principles of vector spaces, Concept of orthogonality
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform.
	VR17	02	B.Tech-Electrical and Electronics 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
	VR17	02	B.Tech-Electrical and Electronics 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.
38	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173104	Electrical Measurements	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, frequency, phase difference and magnetic measurements.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Calibrate voltmeter,ammeter, energy meter by suitable methods.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Select suitable bridge for measurement of electrical parameters.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Measure voltage, current, resistance by using potentiometer and frequency and phase difference between signals using CRO.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO1	Examine the operation of DC-AC inverter circuits and AC-AC converters

39	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173105	Power Electronics	CO2	Apply minimization techniques like boolean algebra and K-maps.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze Combinational Logic Circuits and sequential logic circuits
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design Combinational logic circuits and Sequential Logic Circuits.
40	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173106	Digital Electronics	CO1	Understand the Number Systems and their conversions and Describe about Logic Gates and logic families.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply minimization techniques like boolean algebra and K-maps.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze Combinational Logic Circuits and sequential logic circuits
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design Combinational logic circuits and Sequential Logic Circuits.
41	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173121	Power Electronics Lab	CO1	Explain about characteristics of various power semiconductor devices and firing circuits.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyze the performance of single–phase and three–phase full–wave bridge converters with both resistive and inductive loads.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Illustrate the working of Buck converter, Boost converter, single–phase square wave inverter and PWM inverter.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Describe the operation of single phase AC voltage regulator with resistive loads.
42	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173122	Control Systems Lab	CO1	Analyze the performance and working of magnetic amplifier, D.C and A.C servo motor and Synchro Transmitter and Receiver
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Determine the transfer function of a DC motor and compare P,PI,PD and PID controllers.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Understand the working of PID controller in temperature control application and position control systems
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design Lag, lead compensators by using Simulation.
43	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173123	Data Structures Lab	CO1	Select the appropriate data structure and analyze the performance of algorithms.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Develop single,double and circular linked lists
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Implement stacks and queues using arrays and linked lists
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design programs by nonlinear data structures such as tree and graphs
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO1	Explain the Fundamentals of electric drive and different electric braking methods.

44	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173201	Power Electronic Controllers &Drives	CO2	Analyze the speed control DC motors through controlled converters (1- phase) and choppers.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Differentiate the stator side control and rotor side control of three phase induction motor using power converters.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Describe VSI, PWM tecniques to control the synchronous motor
45	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173202	Power System Analysis	CO1	Understanding the perunit quantities, develop impedence diagram and formulate Y-Bus and Z-Bus.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply power flow solution methods for the given power system network.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Solve short circuit currents for symmetrical and unsymmetrical faults.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyze the steady state and transient stability of power systems.
46	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173203	Renewable Energy Systems	CO1	Understand the differanent RES and MPPT techniques to extract the Maximum Power
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyze standalone and grid connected wind and PV systems
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Design The solar PV as stand allown and grid connected mode
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design The Hybrid Energy System
47	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173204	Microprocessors and Microcontrollers	CO1	Demonstarte the architecture of microprocessors and microcontrollers.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Implement interfacing circuits to microprocessor or a microcontroller suitable for the given application
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Develop assembly language program in 8085,8086 and 8051 for various applications.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design and Develop interfacing circuit for any industrial application and write a coding for that
48	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173205	Electric Vehicles	CO1	Explain the concepts and drive train configurations of electric drive vehicles
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Describe different electric propulsion systems and energy storage devices
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Discuss the technology, design methodologies and control strategy of electric vehicles.
	VR17	02	B.Tech-Electrical and Electronics 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.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO1	To define an objective function and constraint functions in terms of design variables, and then state the optimization problem.

49	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173206	Optimization Techniques	CO2	To solve single variable and multi variable optimization problems, without and with constraints.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	To apply linear and non-linear programming technique to an optimization problem.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	To explain basic principles of Genetic Algorithms and Particle Swarm Optimization methods
50	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173207	Instrumentation	CO1	To understand the characteristics of signals their representation
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	To interpret the operation of transducers
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	To analyze the Measurement of Non–Electrical Quantities
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	To evaluate Signal Analyzers
51	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173208	Special Electrical Machines	CO1	Understand the performance and principle of operation of stepper motor ,Switch d reluctance motor,PMDC,PM Materials and BLDC motors
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Implement different control and switching circuits for stepper motor,SRM,BLDC motors
	VR17	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
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design the constructional features of Switched reluctance motor
52	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173209	Neural Networks & Fuzzy Logic	CO1	Summarise different models of artificial neuron, learning rules and different paradigms of ANN.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyse and test Associative Memories and Hopfield Networks.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Classify classical and fuzzy sets and perform operations on fuzzy relations.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Apply Neural Networks and fuzzy logic for Power System and Speed control of DC Motor
53	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173210	Energy Audit and conservation & Management	CO1	Understand principles of energy auditing and propose energy conservation schemes
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Demonstrate principle and organizing energy management program
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze power factor improvement methods, the operating principle of energy efficient motors, Space Heating, Ventilation and Energy Instruments
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Compute and analyze the economic aspects of energy consumption

54	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173221	Electrical Measurements Lab	CO1	Mesurement of electrical perameters Voltage, Current, Active and Reactive power, Energy, Resistance , Inductance, Capacitance and Impedance.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Explain about instrument transformers and their application and use
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Calibrate Voltmeter, Ammeter, Wattmeter, Energy Meter, LVDT, and Strain Guage.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Test transformer oil for its effectiveness
55	VR17	02	B.Tech-Electrical and Electronics Engineering	1002173222	Microprocessors and Microcontrollers (MPMC) Lab	CO1	Develop the Logic for the basic arithmetic operations, string operations and code converstions using 8086 microprocessor
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Design the Interfacing circuit for the serial communication and timer operations using 8051 Micro controller
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Develop program to Generate wave forms by interfacing 8255-PPI to 8086 and 8051
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	design a Interface and operate stepper motor and traffic signal lights using 8086 and 8051
56	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174101	Utilization of Electrical Energy	CO1	Identify a suitable motor for electric drive and industrial application and understand various heating and welding methods
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Understand the basic terminology in illumination and compare different types of lamps
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyze the speed –time characteristics of different services
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Calculate the tractive effort and specific energy consumption for the given run and understanding the principles of energy efficient and modern tractive motors
57	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174102	Programmable Logic Controller	CO1	Demonstrate the PLCs and their I/O devices.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Write the Ladder Logic for Various Basic Applications.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Develop ladder logic for timer and counter functions to PLC
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Construct PLC hardware connections and Develop programming for any industrial control application.
58	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174103	Power System Operation & Control	CO1	Understand the operation of various components of power system control.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Apply algorithms to solve optimal scheduling of Hydrothermal Systems.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyse single area and two area load frequency control.

	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Evaluate performance of reactive power compensation in transmission systems.
59	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174104	Switchgear and Protection	CO1	Understand the different types of Circuit Breakers and Relay in Power system
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Design the rating of CB and Relay to protect the Power System against the Faults
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Differentiate the grounded and ungrounded power system against over voltage Protection
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Apply suitable protection schemes for different types of faults occur in transformers, alternators, feeders and bus bars
60	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174105	Distributed Generation and Microgrids	CO1	understand the topologies and interconnection issues of DGs
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	reliaze the features of grid connected DG systems
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	ilustrate the design power converter topologies for DG applications
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	determine the control of MG and understand market issues of Microgrid
61	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174106	Advanced Control Systems	CO1	Understand the State space representation and nonlinear systems.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Understand the application of calculus of variations to optimal control problems
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Determine the state feedback gains with & without observer
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design optimal Linear Quadratic regulator
62	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174121	Electrical Simulation Lab	CO1	Develop bode plots, root locus and Nyquist plots for the transfer functions of systems up to 5th order.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Converter, full convertor and PWM inverter.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Simulate D.C separately excited motor and transmission line by incorporating line, load and transformer models.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyse transient analysis of RLC circuit and single machine connected to infinite bus.
63	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174122	Power Systems & Simulation Lab	CO1	Analyze the fault current and sequence impedance of 3-phase alternator and transformer.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Compare the settling time and steady state error for LFC with and without controller.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Perform load flow analysis for a N-bus system using GS & NR method

	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Calculate the economical load dispatch for optimum operation of generators & to determine the A,B,C,D parameters for a long ,medium, short transmission line.
64	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174201	Digital Control Systems	CO1	Understand the modelling of digital control Systems in frequency domain and time domain.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Reliaze the z–transformations and their role in the mathematical analysis of different systems
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Analyse stability of the Linear Discrete systems
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Design the state feedback controller for Linear Discrete systems
6	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174202	HVDC Transmissio n	CO1	Compare HVDC and AC transmission system w.r.t. economical, technical and reliability aspects.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Analyze the six pulse and twelve pulse converter configurations and describe converter control characteristics and reactive power control in HVDC transmission system.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Distinguish various converter faults and protection methods in HVDC transmission system.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Calculate AC harmonics and design suitable filters to eliminate them.
66	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174203	Electrical Distribution Systems	CO1	Understand the Design of substations and distribution systems and Identifying the different factors of distribution systems
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Calculate voltage drops and power loss manually at each and every point in a line.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Ilustrate the distribution system protection and its coordination schemes
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Analyse the effect of compensation on p.f improvement and voltage control on distribution system
67	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174204	Smart Grid Technologi es	CO1	Explain the concept of Resilient and Self-Healing Grid.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Discuss Plug-in Hybrid Electric Vehicles (PHEVs) and the concept of Vehicle-to-Grid.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Describe Smart Substations, GIS, Smart Storage, WAMS and PMU.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	DiscussMicro Grids (MGs) and Distributed Energy Resources (DERs) and alsoPQ issues with RES and also ICT for Smart Grid.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO1	Explain power flow control in transmission lines using FACTS controllers
	VR17	02	B.Tech-Electrical and Electronics Engineering		Flexible Alternating	CO2	Compare voltage sourced converter (VSC) and current sourced converter (CSC)

68	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174205	Current Transmission Systems	CO3	Analyze Shunt compensation methods to improve transient stability and reduce power oscillations in the transmission lines.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Discuss operation and control of SVC and STATCOM and describe series compensators and combined compensators used in enhancing the performance of transmission lines.
69	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174206	Power System Reforms	CO1	Explain the importance of power system deregulation and restructuring.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Compute ATC.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Describe transmission congestion management.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Compute electricity pricing and explain power system operation in deregulated environment and also discuss the importance of ancillary services.
70	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174207	Condition Monitoring of Electrical Equipments	CO1	Estimate the condition of various electrical installation based on Insulationstatus.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Implement condition monitoring plan for complete ElectricalSystem
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Identify amount of damage/deterioration in theEquipment
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Check the mechanical stability of the electricalequipment
71	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174231	Main Project	CO1	Apply knowledge of Electrical and Electronics engineering fundamentals to solve the complex Engineering problems
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Design prototypes & solutions to solve the specific needs related with public health, safety, society, cultural and environment leading to sustainable development following ethical values
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Apply appropriate techniques, resources and modern engineering tools during the implementation of project
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Execute a multidisciplinary project leading to the ability of engagement in lifelong learning and self development
72	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174251	Technical Seminar	CO1	Relate literature to formulate problem statements of technology and innovaations in EEE
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Develop documentation, presentation and communication skills for prefession and personal growth following ethical values
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Identify new directions in Multidisciplinary area
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Assess engineering solution and its applications for Real time problem

73	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174261	Comprehensive Viva	CO1	demonstrate the application of the knowledge acquired in the Electrical and Electronics domain to solve the problems of the various forms of organisations/instituions
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Understand the practical difficulties in applying the various forms of solutions to find the feasible solution.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Solve the real life problems and assess the implications of various forms of solutions.
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Exhibit professional etiquette suitable for career progression and Present their views cogently and precisely
74	VR17	02	B.Tech-Electrical and Electronics Engineering	1002174281	Internship	CO1	Demonstrate the application of knowledge and skill sets acquired from the course and workplace in the assigned job functions
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO2	Exhibit critical thinking and problem solving skills by analysing underlying issue/s to challenges
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO3	Solve real life challenges in the workplace by analysing work environment and conditions, and selecting appropriate skill sets acquired from the course
	VR17	02	B.Tech-Electrical and Electronics Engineering			CO4	Articulate career options by considering opportunities in company, sector, industry, professional and educational advancement;

PRINCIPAL
VIGNAN'S INSTITUTE OF
Information Technology (A)
Visakhapatnam-49

VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY(A)							
B.TECH. 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	VR17	01	B.Tech-Civil Engineering	1000171101	ENGLISH-1	CO1	Enhance English Language by relating the ideas of eminent personalities.
	VR17	01	B.Tech-Civil Engineering			CO2	Articulate the technological advancements fluently.
	VR17	01	B.Tech-Civil Engineering			CO3	Inculcate the art of thinking and writing clearly and logically.
	VR17	01	B.Tech-Civil Engineering			CO4	Enact various themes through team work and learn the usage of vocabulary through humourous texts.
2	VR17	01	B.Tech-Civil Engineering	1000171102	MATHEMATICS-1	CO1	Solve the first and higher order linear differential equations.
	VR17	01	B.Tech-Civil Engineering			CO2	Estimate extrema and series expansions of functions of several variables.
	VR17	01	B.Tech-Civil Engineering			CO3	Interpret area and volume using double integral and triple integral.
	VR17	01	B.Tech-Civil Engineering			CO4	Evaluate of solution of Ordinary differential equations by using Laplace Transform technique.
3	VR17	01	B.Tech-Civil Engineering	1000171104	ENGINEERING CHEMISTRY	CO1	Categorize various types of polymeric materials, fuels, lubricants, refractories and establish their applications.
	VR17	01	B.Tech-Civil Engineering			CO2	Analyze the hardness of water and describe various softening techniques.
	VR17	01	B.Tech-Civil Engineering			CO3	Illustrate the principles of green synthesis, corrosion and its preventive measures.
	VR17	01	B.Tech-Civil Engineering			CO4	Emphasize on various engineering materials like nano materials, solar cells and it's applications.
4	VR17	01	B.Tech-Civil Engineering	1000171105	COMPUTER PROGRAMMING USING C	CO1	Write compile and debug Programs in C language
	VR17	01	B.Tech-Civil Engineering			CO2	Use operators, data types and write programs
	VR17	01	B.Tech-Civil Engineering			CO3	Select the best loop construct for a given problem
	VR17	01	B.Tech-Civil Engineering			CO4	Design and implement C programs
5	VR17	01	B.Tech-Civil Engineering	1000171112	ENVIRONMENTAL STUDIES	CO1	Elucidate the natural resource & their importance for the sustenance of life and recognises the need to conserve natural resource
	VR17	01	B.Tech-Civil Engineering			CO2	Gives the broad view on the various attributes of pollution & and their impact & measure to reduce he pollution along with waste management
	VR17	01	B.Tech-Civil 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
	VR17	01	B.Tech-Civil Engineering			CO4	Educates about Environmental Impact Assessment, Environmental Impact Statement & Environmental Audit
6	VR17	01	B.Tech-Civil Engineering	1000171116	ENGINEERING MECHANICS	CO1	Analyze the force systems for equilibrium conditions and able to draw free body diagram.
	VR17	01	B.Tech-Civil Engineering			CO2	Evaluate the frictional forces between contact surfaces.
	VR17	01	B.Tech-Civil 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.
	VR17	01	B.Tech-Civil Engineering			CO4	Analyse the motion and calculate trajectory characteristics.

7	VR17	01	B.Tech-Civil Engineering	1000171121	ENGLISH COMMUNICATION SKILLS LAB-I	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	01	B.Tech-Civil Engineering			CO2	Articulate with others by using proper functions.
	VR17	01	B.Tech-Civil Engineering			CO3	Enact the roles with proper body language.
	VR17	01	B.Tech-Civil Engineering			CO4	Communicate fluently with proper pronunciation
8	VR17	01	B.Tech-Civil Engineering	1000171127	ENGINEERING CHEMISTRY LAB	CO1	Categorize various types of polymeric materials, fuels, lubricants, refractories and establish their applications.
	VR17	01	B.Tech-Civil Engineering			CO2	analyze hardness of water and describe various softening methods
	VR17	01	B.Tech-Civil Engineering			CO3	Illustrate the principles of green chemistry, corrosion and its prevention and demonstrate the construction and working of batteries
	VR17	01	B.Tech-Civil Engineering			CO4	Emphasize on various engineering materials like nanomaterials, solar cells and their applications.
9	VR17	01	B.Tech-Civil Engineering	1000171128	COMPUTER PROGRAMMING LAB	CO1	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment
	VR17	01	B.Tech-Civil Engineering			CO2	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs
	VR17	01	B.Tech-Civil Engineering			CO3	Understand and apply the in-built functions and customized functions for solving the problems.
	VR17	01	B.Tech-Civil Engineering			CO4	Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
10	VR17	01	B.Tech-Civil Engineering	1000171201	ENGLISH-II	CO1	Develop communication skills by inferring the technological advancements.
	VR17	01	B.Tech-Civil Engineering			CO2	Identify the life of eminent personalities.
	VR17	01	B.Tech-Civil Engineering			CO3	Relate the importance of Environment and its sustainability to language learning
	VR17	01	B.Tech-Civil Engineering			CO4	Create the art of writing by applying apt vocabulary and grammar.
11	VR17	01	B.Tech-Civil Engineering	1000171202	ENGINEERING MATHEMATIC-II	CO1	Estimate numerical solution of non Linear equation.
	VR17	01	B.Tech-Civil Engineering			CO2	Construct Interpolating polynomial for the given data.
	VR17	01	B.Tech-Civil Engineering			CO3	Calculate Numerical Solution of ODE and Numerical Integration.
	VR17	01	B.Tech-Civil Engineering			CO4	Evaluate Fourier series and Fourier transforms for functions.
12	VR17	01	B.Tech-Civil Engineering	1000171203	ENGINEERING MATHEMATIC-III	CO1	Solve simultaneous linear equations numerically using rank of a matrix and also Eigen values and Eigen vectors of a square matrix.
	VR17	01	B.Tech-Civil Engineering			CO2	Identify and solve partial differential equations.
	VR17	01	B.Tech-Civil Engineering			CO3	Calculate gradient of a scalar function, divergence and curl of a vector function.
	VR17	01	B.Tech-Civil Engineering			CO4	Evaluate line, surface and volume integrals using appropriate integral theorems.
13	VR17	01	B.Tech-Civil Engineering	1000171204	ENGINEERING	CO1	Describe the wave phenomena and working principle of optical instruments.
	VR17	01	B.Tech-Civil Engineering			CO2	Apply the basic knowledge of acoustics and ultrasonics for the understanding of acoustics design and non-destructive testing.

	VR17	01	B.Tech-Civil Engineering		PHYSICS	CO3	Understanding the fundmental concepts of nuclear reactions for working of nuclear reactors.
	VR17	01	B.Tech-Civil Engineering			CO4	Discuss the structural, magnetic and electrical properties of materials.
14	VR17	01	B.Tech-Civil Engineering	1000171205	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	CO1	Able to analyse the various electrical networks.
	VR17	01	B.Tech-Civil Engineering			CO2	Able to understand the operation of DC generators,3-point starter and conduct the Swinburne's Test.
	VR17	01	B.Tech-Civil Engineering			CO3	Able to analyse the performance of transformer.
	VR17	01	B.Tech-Civil Engineering			CO4	Able to explain the operation of 3-phase alternator and 3-phase induction motors.
15	VR17	01	B.Tech-Civil Engineering	1000171206	ENGINEERING DRAWING	CO1	Understand the use of drawing instruments to construct the polygons and curves
	VR17	01	B.Tech-Civil Engineering			CO2	Learn the principle of orthographic projections. Draw Orthographic projections of points, lines.
	VR17	01	B.Tech-Civil Engineering			CO3	Draw the various types of planes and solids its views in different Positions
	VR17	01	B.Tech-Civil Engineering			CO4	Draw isometric views of simple objects
16	VR17	01	B.Tech-Civil Engineering	1000171221	ENGLISH COMMUNICATION SKILLS LAB-II	CO1	Apply the usage of phonemes while referring to the dictionary
	VR17	01	B.Tech-Civil Engineering			CO2	Articulate with others by using proper functions.
	VR17	01	B.Tech-Civil Engineering			CO3	Enact the roles with proper body language.
	VR17	01	B.Tech-Civil Engineering			CO4	Communicate fluently with proper pronunciation
17	VR17	01	B.Tech-Civil Engineering	1000171222	ENGINEERING PHYSICS LAB	CO1	Experimentation of laws of vibrations in strenteched string
	VR17	01	B.Tech-Civil Engineering			CO2	Determination of velocity of sound, rigidity modulus of a wire, acceleration due to gravity, radius of gyration and Planck's constant.
	VR17	01	B.Tech-Civil Engineering			CO3	Analyze the voltage vs. current characteristics of Zener diode and temperature vs. resistance characteristics of a thermistor
	VR17	01	B.Tech-Civil Engineering			CO4	Demonstration of formation Newton's rings, diffraction pattern using grating and induced magnetic field in a cirucuclar coil.
18	VR17	01	B.Tech-Civil Engineering	1000171224	ENGINEERING WORKSHOP	CO1	Study and practice on machine tools and their operations
	VR17	01	B.Tech-Civil Engineering			CO2	Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding
	VR17	01	B.Tech-Civil Engineering			CO3	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling
	VR17	01	B.Tech-Civil Engineering			CO4	Apply basic engineering knowledge for carpentry practice
19	VR17	01	B.Tech-Civil Engineering	1001172101	PROBABILITY AND STATISTICS	CO1	Utilize the permutations and combinations in probability to classify random variables
	VR17	01	B.Tech-Civil Engineering			CO2	Determine the cumulative distribution function, mean and variance of discrete and continuous random variables.
	VR17	01	B.Tech-Civil Engineering			CO3	Evaluate probabilities using normal distribution and describe sampling distribution of means
	VR17	01	B.Tech-Civil Engineering			CO4	Forecast the correlation and regression coefficient for the bi variate data

20	VR17	01	B.Tech-Civil Engineering	1001172102	CONCRETE TECHNOLOGY	CO1	Identify the various types of materials and Understand the quality control tests on construction materials
	VR17	01	B.Tech-Civil Engineering			CO2	Assimilate the behaviour of fresh concrete
	VR17	01	B.Tech-Civil Engineering			CO3	Determine the durability properties of hardened concrete
	VR17	01	B.Tech-Civil Engineering			CO4	Design various grades of concrete mixes as per IS Code
21	VR17	01	B.Tech-Civil Engineering	1001172103	STRENGTH OF MATERIALS - I	CO1	To understand the basics of material properties, stress and strain.
	VR17	01	B.Tech-Civil Engineering			CO2	Compute the shear force and bending moment of beams
	VR17	01	B.Tech-Civil Engineering			CO3	Determine the flexural stresses, shear stresses and deflection in beams
	VR17	01	B.Tech-Civil Engineering			CO4	classify and evaluate the stress of thin and thick cylinders.
22	VR17	01	B.Tech-Civil Engineering	1001172104	BUILDING MATERIALS AND CONSTRUCTION	CO1	Predict the properties of building stones, bricks, tiles and its classifications.
	VR17	01	B.Tech-Civil Engineering			CO2	Describe the types of masonry and the properties, types, defects and alternatives of wood
	VR17	01	B.Tech-Civil Engineering			CO3	Identify building components include lintels, staircases, floors, roofs and trusses
	VR17	01	B.Tech-Civil Engineering			CO4	Distinguish the finishings include proofing, plastering, pointing, washing, paints and describe formwork and scaffolding
23	VR17	01	B.Tech-Civil Engineering	1001172105	SURVEYING - I	CO1	Interpret various instruments to evalute the required fields of surveying
	VR17	01	B.Tech-Civil Engineering			CO2	Examine the local attaractions with tactical methods in compass surveying
	VR17	01	B.Tech-Civil Engineering			CO3	Solve three point problem, two point problem using plane table survey through with graphical method
	VR17	01	B.Tech-Civil Engineering			CO4	Describe levelling survey to find elevations followed by contour mapping
24	VR17	01	B.Tech-Civil Engineering	1001172106	FLUID MECHANICS	CO1	Describe the physical properties of fluids & their influences on fluid motion and Compute hydro static forces on various sub merged Surfaces.
	VR17	01	B.Tech-Civil Engineering			CO2	Compare the concepts of kinematics and dynamics of fluid flow.
	VR17	01	B.Tech-Civil Engineering			CO3	Analyze the boundary layer of fluid in laminar and turbulent flows.
	VR17	01	B.Tech-Civil Engineering			CO4	Calibrate flow in pitot tube, venturi meter, orifice meter, orifices, notches and weirs
25	VR17	01	B.Tech-Civil Engineering	1001172121	SURVEYING FIELD WORK - I LAB	CO1	Measure the distance across obstacles and area of traversing using chain or tape or compass.
	VR17	01	B.Tech-Civil Engineering			CO2	Interpret the area of traverse with the help of plane table survey
	VR17	01	B.Tech-Civil Engineering			CO3	Predict the elevations along longitudinal or cross sections at various locations
	VR17	01	B.Tech-Civil Engineering			CO4	Examine the tools for measurement of latitudes, longitudes and elevations
26	VR17	01	B.Tech-Civil Engineering	1001172122	CONCRETE TECHNOLOGY LAB	CO1	Examine the physical properties of cement
	VR17	01	B.Tech-Civil Engineering			CO2	Differentiate aggregates based on size and find out strength properties of aggregates
	VR17	01	B.Tech-Civil Engineering			CO3	Determine the workability of fresh concrete by various methods.
	VR17	01	B.Tech-Civil Engineering			CO4	Inspect the failure patterns on hardened concrete under compression test and split tensile test.

27	VR17	01	B.Tech-Civil Engineering	1099172103	PROFESSIONAL ETHICS AND HUMAN VALUES	CO1	Relate Ethical Human Values
	VR17	01	B.Tech-Civil Engineering			CO2	Apply Engineering knowledge for societal benefits
	VR17	01	B.Tech-Civil Engineering			CO3	Demonstrate responsibility for Safety, Risk & rights
	VR17	01	B.Tech-Civil Engineering			CO4	Outline the various Current Global Issues
28	VR17	01	B.Tech-Civil Engineering	1001172201	BUILDING PLANNING AND DRAWING	CO1	Utilize the building byelaws and regulations for construction
	VR17	01	B.Tech-Civil Engineering			CO2	Describe the orientation, standards, requirements, types and planning of various residential and public buildings
	VR17	01	B.Tech-Civil Engineering			CO3	Draw the sign conventions of various types of building materials and bonds
	VR17	01	B.Tech-Civil Engineering			CO4	Produce plans and sectional elevations of various residential and public buildings
2	VR17	01	B.Tech-Civil Engineering	1001172202	STRENGTH OF MATERIALS - II	CO1	Illustrate principal stresses, maximum shearing stress, and the stresses acting on a structural member
	VR17	01	B.Tech-Civil Engineering			CO2	Determine the deflections and rotations produced by Torsional loading of shafts apply the theories of failure
	VR17	01	B.Tech-Civil Engineering			CO3	Evaluate direct and bending stresses in columns and compute deflections in springs
	VR17	01	B.Tech-Civil Engineering			CO4	Analyze columns and struts subjected to axial loading under various end conditions
30	VR17	01	B.Tech-Civil Engineering	1099172203	MANAGEMENT SCIENCE	CO1	Illustrate various functions of production and inventory management
	VR17	01	B.Tech-Civil Engineering			CO2	Determine the various concepts of strategic management and project management
	VR17	01	B.Tech-Civil Engineering			CO3	Analyze the process of matching manager qualifications with position requirements and concept of marketing mix
	VR17	01	B.Tech-Civil Engineering			CO4	Compare the various contemporary issues of management
31	VR17	01	B.Tech-Civil Engineering	1001172204	HYDRAULICS AND HYDRAULICS MACHINERY	CO1	Analyzing the behaviour of uniform and non uniform flow in a open channel.
	VR17	01	B.Tech-Civil Engineering			CO2	Creating a model for a prototype by using the concept of simulation.
	VR17	01	B.Tech-Civil Engineering			CO3	Applying the concept of generating hydroelectricity using hydraulic turbines.
	VR17	01	B.Tech-Civil Engineering			CO4	Estimate the head and discharge through Centrifugal-Pumps and Reciprocating-Pumps in detail
32	VR17	01	B.Tech-Civil Engineering	1001172205	SURVEYING - II	CO1	Measure the distances and elevations using Theodilte and Tacheomatric surveying
	VR17	01	B.Tech-Civil Engineering			CO2	Organise simple and compound curves using various methods of theodilite surveying
	VR17	01	B.Tech-Civil Engineering			CO3	Compute the areas and volumes of embankments, cuttings, reservoir etc. by various methods
	VR17	01	B.Tech-Civil Engineering			CO4	Examine the various measurements in acessing the areial survey
33	VR17	01	B.Tech-Civil Engineering	1001172206	STRUCTURAL ANALYSIS - I	CO1	Distinguish between stable and unstable and statically determinate and indeterminate structures
	VR17	01	B.Tech-Civil Engineering			CO2	Analyze the S.F, B.M and deflection of propped, fixed and continuous beams
	VR17	01	B.Tech-Civil Engineering			CO3	Calculate the deflections of truss structures and beams by using strain energy method.
	VR17	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.

34	VR17	01	B.Tech-Civil Engineering	1001172207	TRANSPORTATION ENGINEERING - I	CO1	Understand the basic concepts of highway planning and alignment
	VR17	01	B.Tech-Civil Engineering			CO2	Design of geometric elements of highway to resolve the transportation network issues
	VR17	01	B.Tech-Civil Engineering			CO3	Analyse the traffic flow parameters inline with the demand
	VR17	01	B.Tech-Civil Engineering			CO4	Evaluate the pavement material properties and design suitable pavement
35	VR17	01	B.Tech-Civil Engineering	1001172221	FLUID MECHANICS AND HYDRAULICS MACHINERY LAB	CO1	Determine Coefficient of discharge Venturimeter, Orifice meter, rectangular Notch and /or Triangular Notch, a small orifice, an external mouth piece
	VR17	01	B.Tech-Civil Engineering			CO2	Evaluate the bernoulli's equation, impact of jet on vanes and hydraulic jump
	VR17	01	B.Tech-Civil Engineering			CO3	Illustrate the performance of Pelton wheel turbine and Francis turbine
	VR17	01	B.Tech-Civil Engineering			CO4	Determine the efficiency centrifugal and reciprocating pump
36	VR17	01	B.Tech-Civil Engineering	1001172222	STRENGTH OF MATGERIALS LAB	CO1	Interpret the tensile force on steel bar
	VR17	01	B.Tech-Civil Engineering			CO2	Evaluate the bending stress on cantilever and simply supported beam
	VR17	01	B.Tech-Civil Engineering			CO3	Determine the Torsion, deflection in spring, compression force on wood or concrete
	VR17	01	B.Tech-Civil Engineering			CO4	Deduct the deflection test on beams include cantilever, simply supported and continuous beam
37	VR17	01	B.Tech-Civil Engineering	1001172231	INDUSTRIAL VISIT	CO1	Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to idenitfy solutions
	VR17	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
	VR17	01	B.Tech-Civil Engineering			CO3	Apply civil engineering fundamentals to produce proper solutions to real world problems.
	VR17	01	B.Tech-Civil Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.
38	VR17	01	B.Tech-Civil Engineering	1099172106	MANAGERIAL ECONOMICS AND 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
	VR17	01	B.Tech-Civil Engineering			CO2	Evaluate the production theories and pricing policies of various enterprises
	VR17	01	B.Tech-Civil 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. Analyze different forms of business organizations existing in the modern business and able to choose suitable form of business
	VR17	01	B.Tech-Civil Engineering			CO4	Evaluate investment proposals using capital budgeting tools and techniques.
	VR17	01	B.Tech-Civil Engineering		ENGINEERI	CO1	Understand the failure of some civil engineering constructions due to geological drawbacks through some case histories
	VR17	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

39	VR17	01	B.Tech-Civil Engineering	1001173101	NG GEOLOGY	CO3	Describe the common geological structures associate within different rock strata and classify folds, faults, unconformities and joints based on different criterias
	VR17	01	B.Tech-Civil Engineering			CO4	Investigate subsurface irregularities at construction/foundation site and ground water occurence with the help of various Geophysical methods such as Electrical resistivity method, Seismic refraction method, gravity mehtod etc.
40	VR17	01	B.Tech-Civil Engineering	1001173102	STRUCTURAL ANALYSIS - II	CO1	Analyze the two hinged and three hinged arches for different support levels
	VR17	01	B.Tech-Civil Engineering			CO2	Evaluate and draw the BMD of frames by using lateral load analysis.
	VR17	01	B.Tech-Civil Engineering			CO3	Calculate the internal forces in cable.
	VR17	01	B.Tech-Civil Engineering			CO4	Apply the moment distribution method, kanis method, matrix method to analyze statically indeterminate structures
41	VR17	01	B.Tech-Civil Engineering	1001173103	DESIGN OF REINFORCED CONCRETE STRUCTURES	CO1	Interpret the concepts of working stress method and the limit state method and how they relate to the design of structures.
	VR17	01	B.Tech-Civil Engineering			CO2	Outline the behaviour of RCC structural members for safe design.
	VR17	01	B.Tech-Civil Engineering			CO3	Identify reinforced concrete beam failure modes under shear, torsion and bond and design reinforcement details.
	VR17	01	B.Tech-Civil Engineering			CO4	Design basic structural elements (beams, slabs, columns and footings) according to the design code of IS 456: 2000
42	VR17	01	B.Tech-Civil Engineering	1001173104	TRANSPORTATION ENGINEERING - II	CO1	Interpret the alignment of railway track and sustainable airport site location
	VR17	01	B.Tech-Civil Engineering			CO2	Evaluate the turnout parameters and the intent of various signals
	VR17	01	B.Tech-Civil Engineering			CO3	Design the airport geometrics and airfield pavements
	VR17	01	B.Tech-Civil Engineering			CO4	Examine and plan the construction of the docks and harbours with maintenance
43	VR17	01	B.Tech-Civil Engineering	1001173121	SURVEYING FIELD WORK - II LAB	CO1	Compute the horizontal and vertical angles
	VR17	01	B.Tech-Civil Engineering			CO2	Estimate the heights and distances by method of trigonometric leveling and tachometry
	VR17	01	B.Tech-Civil Engineering			CO3	Design and set the simple curve
	VR17	01	B.Tech-Civil Engineering			CO4	Evaluate the areas, heights, distances and setting out the structures
44	VR17	01	B.Tech-Civil Engineering	1001173122	ENGINEERING GEOLOGY LAB	CO1	Identify and differentiate various minerals through their physical properties
	VR17	01	B.Tech-Civil Engineering			CO2	Identify and differentiate the igneous, sedimentary and metamorphic rocks through megascopic study
	VR17	01	B.Tech-Civil Engineering			CO3	Interpret the geological maps and evaluate the orientation of rock strata by drawing cross section of the ground
	VR17	01	B.Tech-Civil Engineering			CO4	Solve the structural geological problem at foundation sites
45	VR17	01	B.Tech-Civil Engineering	1001173123	TRANSPORATATION ENGINEERING LAB	CO1	Test the aggregates and their suitability for the road construction
	VR17	01	B.Tech-Civil Engineering			CO2	Examine the bitumen and their suitability towrads flexible pavement construction
	VR17	01	B.Tech-Civil Engineering			CO3	Analyze the traffic flow and parking characteristics

	VR17	01	B.Tech-Civil Engineering			CO4	Analyze the capacity and saturation flow of the traffic
46	VR17	01	B.Tech-Civil Engineering	1001173201	DESIGN OF STEEL STRUCTRUES	CO1	Identify the different failure modes of bolted and welded connections, and determine their design strengths.
	VR17	01	B.Tech-Civil Engineering			CO2	Analyse and design tension members, compression members, and beams.
	VR17	01	B.Tech-Civil Engineering			CO3	Differentiate various types of roof trusses and create the solution for purlins to withstand the wind loads.
	VR17	01	B.Tech-Civil Engineering			CO4	Design complicated structures like plate girder, gantry girder
47	VR17	01	B.Tech-Civil Engineering	1001173202	GEOTECHNICAL ENGINEERING - I	CO1	Classify the different types of soil and recognize the various index properties of the soils.
	VR17	01	B.Tech-Civil Engineering			CO2	Analyze the effect of seepage in soil and stability pertaining to slopes
	VR17	01	B.Tech-Civil Engineering			CO3	Evaluate the settlements and increase in the vertical stress due to super structure loads at significant depth in the soil.
	VR17	01	B.Tech-Civil Engineering			CO4	Familiarize the compaction characteristics, consolidation parameters and to showcase its behavior during various engineering applications such as roads,dams,embankments,etc.
48	VR17	01	B.Tech-Civil Engineering	1001173203	ENVIRONMENTAL ENGINEERING - I	CO1	Analyze problems associated with water supply engineering
	VR17	01	B.Tech-Civil Engineering			CO2	Design water conveyance, treatment, storage and distribution systems
	VR17	01	B.Tech-Civil Engineering			CO3	Solve water supply engineering problems through proper investigations and interpretation
	VR17	01	B.Tech-Civil Engineering			CO4	Maintain quality standards in analysis, treatment and distribution of water in water supply schemes.
49	VR17	01	B.Tech-Civil Engineering	1001173204	WATER RESOURCES ENGINEERING - I	CO1	Sketch the hydrologic cycle and discuss its impact on Environment.
	VR17	01	B.Tech-Civil Engineering			CO2	Estimate various abstractions from Precipitation like Evaporation, Evapotranspiration and Infiltration.
	VR17	01	B.Tech-Civil Engineering			CO3	Develop Hydrographs of a Catchment by evaluation the rainfall trends.
	VR17	01	B.Tech-Civil Engineering			CO4	Analyze frequency of Floods to estimate design flood, flood routing and groundwater movement.
50	VR17	01	B.Tech-Civil Engineering	1001173205	ADVANCED SURVEYING USING GPS	CO1	Analyse the geodesy and global positioning systems
	VR17	01	B.Tech-Civil Engineering			CO2	Describe the GPS Signal Structure and GPS Orbits
	VR17	01	B.Tech-Civil Engineering			CO3	Identify the GPS errors and evaluate to accurate results
	VR17	01	B.Tech-Civil Engineering			CO4	Apply the concepts of various GPS survey in practical applications
51	VR17	01	B.Tech-Civil Engineering	1001173206	GROUNDWATER DEVELOPMENT AND MANAGEMENT	CO1	Estimate aquifer parameters and yield of wells
	VR17	01	B.Tech-Civil Engineering			CO2	Analyze radial flow towards wells in confined and unconfined aquifers.
	VR17	01	B.Tech-Civil Engineering			CO3	Interpret geophysical exploration data for scientific source finding of aquifers.
	VR17	01	B.Tech-Civil Engineering			CO4	Apply appropriate measures for groundwater management
52	VR17	01	B.Tech-Civil Engineering	1001173207	WASTE WATER MANAGEMENT	CO1	Distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation.
	VR17	01	B.Tech-Civil Engineering			CO2	Impart knowledge on selection of treatment methods for industrial wastewater.
	VR17	01	B.Tech-Civil Engineering			CO3	Describe the common methods of treatment in different industries

	VR17	01	B.Tech-Civil Engineering			CO4	Design of wastewater treatment plant for the given sewage characteristics
53	VR17	01	B.Tech-Civil Engineering	1001173208	ADVANCED CONCRETE TECHOLOGY	CO1	Use of new materials in Concretes and understand how they affect the properties of concrete
	VR17	01	B.Tech-Civil Engineering			CO2	Describe the merits and demerits and manufacturing procedures of various special concretes used for special purposes
	VR17	01	B.Tech-Civil Engineering			CO3	Appreciate RMC MIX design for special concrete
	VR17	01	B.Tech-Civil Engineering			CO4	Appreciate need for NDT evaluation of concrete and have knowledge on the working principle of some of the methods
54	VR17	01	B.Tech-Civil Engineering	1001173209	TRAFFIC ENGINEERING	CO1	Describe the traffic volume of vehicles
	VR17	01	B.Tech-Civil Engineering			CO2	Design On-street or Off- street parking facility for a study area
	VR17	01	B.Tech-Civil Engineering			CO3	Evalaute the Level of Service of a pavement
	VR17	01	B.Tech-Civil Engineering			CO4	Design rotary intersection of a pavement, Design travel demand models
55	VR17	01	B.Tech-Civil Engineering	1004173209	ELECTRONIC INSTRUMENTATION	CO1	Select the instrument to be used based on the requirements.
	VR17	01	B.Tech-Civil Engineering			CO2	Understand and analyse different signal generators and analysers
	VR17	01	B.Tech-Civil Engineering			CO3	Understand the design of oscilloscopes for different applications
	VR17	01	B.Tech-Civil Engineering			CO4	Design different transducers for measurement of different parameters
56	VR17	01	B.Tech-Civil Engineering	1005173206	INTRODUCTION TO DATA BASE MANAGEMENT SYSTEMS	CO1	Describe ER model and normalization of or database design.
	VR17	01	B.Tech-Civil Engineering			CO2	Create, maintain and manipulate a relational database using SQL
	VR17	01	B.Tech-Civil Engineering			CO3	Design and build database system for a given real world problem
	VR17	01	B.Tech-Civil Engineering			CO4	Examine issues in data storage and query processing and can formulate appropriate solutions.
57	VR17	01	B.Tech-Civil Engineering	1003173206	ALTERNATIVE ENERGY SOURCES	CO1	Examine the working of a photovoltaic system
	VR17	01	B.Tech-Civil Engineering			CO2	Analyze the operation of fuel cells and biomass conversion technologies
	VR17	01	B.Tech-Civil Engineering			CO3	Identify various parts in a wind energy conversion system.
	VR17	01	B.Tech-Civil Engineering			CO4	Suggest alternative resources management like ocean thermal energy conversion and wave energy conversion techniques
58	VR17	01	B.Tech-Civil Engineering	1003173205	HEATING, VENTILATION AND AIR CONDITIONING	CO1	Conclude the role of HVAC systems for human sustainability
	VR17	01	B.Tech-Civil Engineering			CO2	Distinguish the behavior, properties and effects of moist air
	VR17	01	B.Tech-Civil Engineering			CO3	Estimate heating and cooling loads to design an optimized duct and ventilating system.
	VR17	01	B.Tech-Civil Engineering			CO4	Evaluate standard requirements of ventilation for human comfort
59	VR17	01	B.Tech-Civil Engineering	1001173291	MOOCs - NPTEL - Introduction To	CO1	Analyse the sustainability principles in transportation
	VR17	01	B.Tech-Civil Engineering			CO2	Evaluate the Travel Demand Management (TDM)

59	VR17	01	B.Tech-Civil Engineering	1001173291	Multimodal Urban Transportation Systems	CO3	Develop the techniques of urban public transit planning, operations and management
	VR17	01	B.Tech-Civil Engineering			CO4	Apply the concepts to formulate the intelligent transportation systems (ITS)
60	VR17	01	B.Tech-Civil Engineering	1001173221	GEOTECHNICAL ENGINEERING LAB	CO1	Evaluate the index properties of soil that help in analyzing the soil type as per Indian Standard Classification
	VR17	01	B.Tech-Civil Engineering			CO2	Determine seeapge charactreristics of dams and earth embankments
	VR17	01	B.Tech-Civil Engineering			CO3	Familiarize the compaction characteristics, settlement behaviour of various engineereed structures such as roads,dams,etc.
	VR17	01	B.Tech-Civil Engineering			CO4	Evaluate the strength parameters of diffrent foundation soils.
61	VR17	01	B.Tech-Civil Engineering	1001173222	ENVIRONMENTAL ENGINEERING LAB	CO1	Analyze water and wastewater by using appropriate techniques
	VR17	01	B.Tech-Civil Engineering			CO2	Solve water and wastewater problems of the society
	VR17	01	B.Tech-Civil Engineering			CO3	Maintain desirable standards in domestic and industrial water and wastewater
	VR17	01	B.Tech-Civil Engineering			CO4	Function effectively as an individual, and as a member or leader in teams to solve the water and wastewater problems
62	VR17	01	B.Tech-Civil Engineering	1001173223	COMPUTER AIDED ENGINEERING LAB	CO1	Make use of the conventional signs and symbols
	VR17	01	B.Tech-Civil Engineering			CO2	Draw the plan and sectional elevation of footing
	VR17	01	B.Tech-Civil Engineering			CO3	Design the plan, elevation and section of single storied and multi storied building
	VR17	01	B.Tech-Civil Engineering			CO4	Develop the plan and cross section of doglegged staircase
63	VR17	01	B.Tech-Civil Engineering	1001173241	INDUSTRY ORIENTED MINI PROJECT	CO1	Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to idenitfy solutions
	VR17	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
	VR17	01	B.Tech-Civil Engineering			CO3	Apply civil engineering fundamentals to produce proper solutions to real world problems.
	VR17	01	B.Tech-Civil Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.
64	VR17	01	B.Tech-Civil Engineering	1001174101	ESTIMATION AND CONTRACTS	CO1	Understand the preparation of an Abstract Estimate and detailed estimate of building
	VR17	01	B.Tech-Civil Engineering			CO2	Calculate the quantity of materials required for civil works as per specifications
	VR17	01	B.Tech-Civil Engineering			CO3	Determine earth work quantity for roads and canals
	VR17	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
65	VR17	01	B.Tech-Civil Engineering	1001174102	WATER RESOURCE ENGINEERING - II	CO1	Correlate Water requirement of different crops in each season.
	VR17	01	B.Tech-Civil Engineering			CO2	Design lined & unlined canal without impacting the surroundings during floods.
	VR17	01	B.Tech-Civil Engineering			CO3	Distinguish different cross drainage works and canal regulation works.

	VR17	01	B.Tech-Civil Engineering			CO4	Analyze the safety, stability of Gravity dams.
66	VR17	01	B.Tech-Civil Engineering	1001174103	GEOTECHNICAL ENGINEERING - II	CO1	Calculate the shear parameters of the soil affected by different drainage conditions
	VR17	01	B.Tech-Civil Engineering			CO2	Prepare the soil investigation report by using suitable field test
	VR17	01	B.Tech-Civil Engineering			CO3	Understand the failure and stability analysis of slopes and retaining walls
	VR17	01	B.Tech-Civil Engineering			CO4	Analyze the bearing capacity of diffrent soils
67	VR17	01	B.Tech-Civil Engineering	1001174104	ENVIRONMENTAL ENGINEEIRNG - II	CO1	Plan and design the sewerage systems
	VR17	01	B.Tech-Civil Engineering			CO2	Select the appropriate appurtenances in the sewerage systems
	VR17	01	B.Tech-Civil Engineering			CO3	Design suitable treatment flow for sewage treatment
	VR17	01	B.Tech-Civil Engineering			CO4	Evaluate for critical points of pollution in a river and estimate allowable amounts of pollutant disposal into the river
68	VR17	01	B.Tech-Civil Engineering	1001174105	ADVANCED STRUCTURAL ENGINEERING	CO1	Understand the design of different types of RCC retaining walls
	VR17	01	B.Tech-Civil Engineering			CO2	Carry out analysis and design of Slab bridges, T Carryout analysis and design of different types of RCC water tanks.
	VR17	01	B.Tech-Civil Engineering			CO3	Understand the design of RCC flat slab
	VR17	01	B.Tech-Civil Engineering			CO4	Understand the design process of Bunkers, Silos Chimney.Understand the design of transmission towers and loading on them.
69	VR17	01	B.Tech-Civil Engineering	1001174106	URBAN HYDROLOGY	CO1	Analyze the problems of urbanization on hydrological system.
	VR17	01	B.Tech-Civil Engineering			CO2	Develop intensity duration frequency curves for urban drainage systems.
	VR17	01	B.Tech-Civil Engineering			CO3	Use various approaches to estimate peak flow.
	VR17	01	B.Tech-Civil Engineering			CO4	Design the elements of urban drainage system and apply best management practices to manage urban flooding
70	VR17	01	B.Tech-Civil Engineering	1001174107	GROUND IMPROVEMENT TECHNIQUES	CO1	Possess the knowledge of various methods of ground improvement and their suitability to different field situations
	VR17	01	B.Tech-Civil Engineering			CO2	Understand the concept of Dewatering Techniques.
	VR17	01	B.Tech-Civil Engineering			CO3	Understand the stabilization methods and design principles of retaining walls for analysis
	VR17	01	B.Tech-Civil Engineering			CO4	Outline the various function of Geosynthetics and its application in Civil engineering
71	VR17	01	B.Tech-Civil Engineering	1001174108	PAVEMENT ANALYSIS AND DESIGN	CO1	Understand The basic of components of pavement, stresses occurred in pavement and Understand The basic elements in design of flexible pavement
	VR17	01	B.Tech-Civil Engineering			CO2	Design of the flexible pavements along with various Standard methods
	VR17	01	B.Tech-Civil Engineering			CO3	Design of the Rigid pavements along with various standard methods
	VR17	01	B.Tech-Civil Engineering			CO4	Analysis of Temperature stresses , reinforced slabs
	VR17	01	B.Tech-Civil Engineering			CO1	Retrieve the information content of remotely sensed data

72	VR17	01	B.Tech-Civil Engineering	1001174109	REMOTE SENSING AND GIS APPLICATIONS	CO2	Develop knowledge on conversion of data from analogue to digital and working with GIS software.
	VR17	01	B.Tech-Civil Engineering			CO3	Understand and Develop models for GIS spatial Analysis
	VR17	01	B.Tech-Civil Engineering			CO4	Apply knowledge of GIS and understand the integration of Remote Sensing and GIS
73	VR17	01	B.Tech-Civil Engineering	1001174110	INDUSTRY ORIENTED COURSE - MINI PROJECT	CO1	Analyze engineering problems and apply principles of civil engineering and relevant disciplines to idenitfy solutions
	VR17	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
	VR17	01	B.Tech-Civil Engineering			CO3	Apply civil engineering fundamentals to produce proper solutions to real world problems.
	VR17	01	B.Tech-Civil Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.
74	VR17	01	B.Tech-Civil Engineering	1005172104	JAVA PROGRAMMING	CO1	Identify the concepts and features of object oriented programming in Java.
	VR17	01	B.Tech-Civil Engineering			CO2	Describe and implement the programs with command line arguments and Scanner Class.
	VR17	01	B.Tech-Civil Engineering			CO3	Analyze and implement the concepts of Inheritances and Multithreading with real world scenario.
	VR17	01	B.Tech-Civil Engineering			CO4	Develop GUI programs using Applets and Event Handling.
75	VR17	01	B.Tech-Civil Engineering	1003173201	FINITE ELEMENT METHODS	CO1	Understand the concepts behind variational methods and weighted residual methods in FEM.
	VR17	01	B.Tech-Civil Engineering			CO2	Identify the application and characteristics of FEA elements such as bars, beams, plane and isoparametric elements.
	VR17	01	B.Tech-Civil Engineering			CO3	Apply suitable boundary conditions to a global structural equation, and reduce it to a solvable form.
	VR17	01	B.Tech-Civil Engineering			CO4	Able to identify how the finite element method expands beyond the structural domain, for problems involving dynamics, heat transfer, and fluid flow
76	VR17	01	B.Tech-Civil Engineering	1004173207	DIGITAL IMAGE PROCESSING	CO1	Analyze various types of images mathematically
	VR17	01	B.Tech-Civil Engineering			CO2	Compare image enhancement methods in spatial and frequency domains
	VR17	01	B.Tech-Civil Engineering			CO3	Demonstrate various segmentation algorithms for given image
	VR17	01	B.Tech-Civil Engineering			CO4	Justify different techniques for image compression
77	VR17	01	B.Tech-Civil Engineering	1005172105	DATA STRUCTURES THROUGH C	CO1	Understand data structures concepts for solving computing problems.
	VR17	01	B.Tech-Civil Engineering			CO2	Implement standard data structures like stack, queue
	VR17	01	B.Tech-Civil Engineering			CO3	Understand sorting and searching algorithms to the small and large data.
	VR17	01	B.Tech-Civil Engineering			CO4	Apply and Implement basic data structures such as trees for real-time applications
78	VR17	01	B.Tech-Civil Engineering	1099174101	ENTREPRENEURSHIP DEVELOPMENT	CO1	Interpret the roles of Entrepreneur
	VR17	01	B.Tech-Civil Engineering			CO2	Identify the Factors, remedies for sickness of industry
	VR17	01	B.Tech-Civil Engineering			CO3	Summarize capital and financial sources, Govt. polices.

	VR17	01	B.Tech-Civil Engineering			CO4	Design Project proposal
79	VR17	01	B.Tech-Civil Engineering	1099173101	IPR & PATENTS	CO1	Interpret the various aspects of IPR
	VR17	01	B.Tech-Civil Engineering			CO2	Conclude importance of Copyrights, Trademarks & Trade Secrets
	VR17	01	B.Tech-Civil Engineering			CO3	Obtain Patent Rights for New Innovations
	VR17	01	B.Tech-Civil Engineering			CO4	Elaborate on Privacy Issues
80	VR17	01	B.Tech-Civil Engineering	1001174121	GIS AND CAD LAB	CO1	Organise and create structural memebers by using staad pro software.
	VR17	01	B.Tech-Civil Engineering			CO2	Generate the thematic map from digitised map. Estimate the features and develop the digital elevation model
	VR17	01	B.Tech-Civil Engineering			CO3	Apply GIS software to simple problems in water resources and transportation engineering
	VR17	01	B.Tech-Civil Engineering			CO4	Analyse & Design a 2 D and 3D frame steel tubular truss using structuralanalysis software
81	VR17	01	B.Tech-Civil Engineering	1001174122	DESIGN AND DRAWING OF HYDRAULIC STRUCTURES	CO1	Draft the dimensional views of surplus weir and tank sluice
	VR17	01	B.Tech-Civil Engineering			CO2	Contrast the dimensional views of Canal works as per scale
	VR17	01	B.Tech-Civil Engineering			CO3	Illustrate the cross sectional views of various Hydraulic structures
	VR17	01	B.Tech-Civil Engineering			CO4	Categorize the insitu design requirements of different water storage, diversion structures
82	VR17	01	B.Tech-Civil Engineering	1001174201	SOIL DYNAMICS AND FOUNDATIONS	CO1	Apply knowledge of mathematics, science, and engineering in analyzing and interpreting earthquake related problems and providing the optimal and achievable solutions
	VR17	01	B.Tech-Civil Engineering			CO2	Design a system, concept, or process to meet the desired needs in solving practical problems considering its technical, professional, and ethical aspects
	VR17	01	B.Tech-Civil Engineering			CO3	Impart knowledge that enable the impact of engineering problems and their solutions in global, economic, environmental, and social context.
	VR17	01	B.Tech-Civil Engineering			CO4	Develop skills and techniques to use basic concepts and tools in civil engineering especially in geotechnical engineering problems associated with the dynamic loading.
83	VR17	01	B.Tech-Civil Engineering	1001174202	CONSTRUCTION TECHNOLOGY AND MANAGEMENT	CO1	Construct network diagrams and compute critical path, slack and floats for a given network diagram.
	VR17	01	B.Tech-Civil Engineering			CO2	Apply techniques to optimize time, cost and manpower resources.
	VR17	01	B.Tech-Civil Engineering			CO3	Identify the suitable equipment for performing different construction operations.
	VR17	01	B.Tech-Civil Engineering			CO4	Understand the fundamentals of quality management and safety management systems in construction industry
84	VR17	01	B.Tech-Civil Engineering	1001174203	PRESTRESSED CONCRETE	CO1	Understand the concepts of pre-stressing in concrete structures and identify the materials for pre-stressing
	VR17	01	B.Tech-Civil Engineering			CO2	Calculate the stresses, losses and deflections of pre and post tensioned memebers.
	VR17	01	B.Tech-Civil Engineering			CO3	Design flexure and shear reinforcement for prestressed concrete

	VR17	01	B.Tech-Civil Engineering			CO4	Interpet the torsional reinforcement and calculate the anchorage zone stresses in pre and post tension.
85	VR17	01	B.Tech-Civil Engineering	1001174204	BRIDGE ENGINEERING	CO1	Explain different types of Bridges with diagrams and Loading standards
	VR17	01	B.Tech-Civil Engineering			CO2	Carry out analysis and design of Slab bridges, T Beam bridges, Box culvers and suggest structural detailing.
	VR17	01	B.Tech-Civil Engineering			CO3	Carry out analysis and design of Plate girder bridges.
	VR17	01	B.Tech-Civil Engineering			CO4	Understand the stability analysis of Piers. Organize for attending inspections and maintenance of bridges and prepare reports.Understand the design of abutments.
86	VR17	01	B.Tech-Civil Engineering	1001174205	ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT	CO1	Understand evaluate and create the basic concept of environmental impact assessment, Flow of EIA, Types of environmental Impacts
	VR17	01	B.Tech-Civil Engineering			CO2	ImplementdifferentmethodsinpreparinganEnvironmentalImpactStatement
	VR17	01	B.Tech-Civil Engineering			CO3	Identifyvariousmitigationmeasuresthatcanbeused.
	VR17	01	B.Tech-Civil Engineering			CO4	Select methodology for identification of environmental impacts, environmental indices and indicators
87	VR17	01	B.Tech-Civil Engineering	1001174206	SOLID HAZARDOUS WASTE MANAGEMENT	CO1	Understand the implications of the production, resource management and environmental impact of solid waste management;
	VR17	01	B.Tech-Civil Engineering			CO2	To apply the knowledge of mathematics, science, and engineering for effective solid waste collection systems, for waste collection route optimization and for processing of solid waste
	VR17	01	B.Tech-Civil Engineering			CO3	To design composting systems, maintain and operate the aerobic and anaerobic composting process for effective organic waste recycling.
	VR17	01	B.Tech-Civil Engineering			CO4	To manage construction and operations of landfill facilities, energy recovery systems and management of leachate systems.
88	VR17	01	B.Tech-Civil Engineering	1001174207	WATER RESOURCES SYSTEMS PLANNING AND MANAGEMENT	CO1	Apply optimization methods to solve problems related to water resource systems
	VR17	01	B.Tech-Civil Engineering			CO2	Perform basic economic analysis to evaluate the economic feasibility of water resources projects
	VR17	01	B.Tech-Civil Engineering			CO3	Formulate optimization models for decision making in water resources systems.
	VR17	01	B.Tech-Civil Engineering			CO4	Draft simulation models for planning and design of Water Resources Systems
89	VR17	01	B.Tech-Civil Engineering	1001174208	TRANSPORTATION PLANNING	CO1	Understand travel and route choice behaviour
	VR17	01	B.Tech-Civil Engineering			CO2	Recall basic concepts and methods of urban transportation planning in the India.
	VR17	01	B.Tech-Civil Engineering			CO3	Summarize methods of designing, conducting and administering surveys to provide the data required for transportation planning.
	VR17	01	B.Tech-Civil Engineering			CO4	Examine and apply travel demand modelling, Mode Choice Modelling and Traffic Assignment Modelling.,Formulate the need of land use modelling and illustrate land use models for urban transportation planning.
	VR17	01	B.Tech-Civil Engineering			CO1	Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to idenitfy solutions

90	VR17	01	B.Tech-Civil Engineering	1001174281	INTERNSHIP	CO2	Design, implement, and evaluate a solution to meet the requirements in the context of the civil engineering program's discipline
	VR17	01	B.Tech-Civil Engineering			CO3	Apply civil engineering fundamentals to produce proper solutions to real world problems.
	VR17	01	B.Tech-Civil Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.
91	VR17	01	B.Tech-Civil Engineering	1001174251	TECHINCAL SEMINAR	CO1	Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to idenitfy solutions
	VR17	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
	VR17	01	B.Tech-Civil Engineering			CO3	Apply civil engineering fundamentals to produce proper solutions to real world problems.
	VR17	01	B.Tech-Civil Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.
92	VR17	01	B.Tech-Civil Engineering	1001174261	COMPEREHENSIVE VIVA	CO1	Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to idenitfy solutions
	VR17	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
	VR17	01	B.Tech-Civil Engineering			CO3	Apply civil engineering fundamentals to produce proper solutions to real world problems.
	VR17	01	B.Tech-Civil Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.
93	VR17	01	B.Tech-Civil Engineering	1001174231	MAIN PROJECT	CO1	Analyze a complex engineering problem and to apply principles of civil engineering and relevant disciplines to idenitfy solutions
	VR17	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
	VR17	01	B.Tech-Civil Engineering			CO3	Apply civil engineering fundamentals to produce proper solutions to real world problems.
	VR17	01	B.Tech-Civil Engineering			CO4	Recognize professional responsibilities and make informed judgments in civil practice based on legal and ethical principles.

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