LAKSHMI NARAYAN COLLEGE OF TECHNOLOGY EXCELLENCE, BHOPAL

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES(CO'S)

FIRST YEAR

BT-101 ENGINEERING CHEMISTRY	
CO1	Solve analytical problem of hard water
CO2	Use lubricants in relevant fields
CO3	Apply polymer science in daily life
CO4	Analyse phases of heterogeneous systems
CO5	Interpret atomic and molecular structure of substances
BT-102 ENGINEERING CHEMISTRY	
CO1	Introduce the fallout of the rolle's theorem that is fundamental to application of analysis to engineering problem.
CO2	To introduce the idea of applying differential and integral calculus of curvature and to improve integral apart from some application it gives a basic introduction on beta and gamma function.
CO3	To develop the tool of power series and fourier series for learning advance engineering mathematics.
CO4	To familiarize the student with linear algebra that is essential in most branches of engineering.
CO5	To create the essential tool of matrices in a comprehensive manners.
BT-103 ENGLISH FOR COMMUNICATION	
CO1	Able to understand the role of effective communication for success in professional world and develop effective communication to be employable.
CO2	Able to read actively and write and speak with grammatical correctness.
CO3	Enhance all four basic skills of language learning specially listening and understanding any kind of spoken material adored with different accent, voice modulation, tone variation and stress pattern.
CO4	Inculcate the art of effective presentation with proper body language and voice modulation.
CO5	Hone writing business correspondence like business letters and reports properly.
BT-104 BEEE	
CO1	Analyse and solve dc circuits using various electric laws.
CO2	Interpret the sinusoidal electrical quantities and parameters mathematically as well as graphically for 1- phase/3-phase ac circuits.
CO3	Explain construction, working, application and losses of transformer
CO4	Explain the working principle, construction, applications of dc and ac machines.
CO5	Apply the concepts of basic electronics to design various electronic circuits.
BT-105 ENGINEERING GRAPHICS	
CO1	Ability to develop an understanding of construction of different types of scales and curves, their use in preparation of drawing of different elements.
CO2	Knowledge of projections, types of projection and projections of straight lines. Familiarize with the projections of 1d, 2d& 3d elements.
CO3	Ability to identify and construction of projections of planes and solids and their use in preparation and interpretation of building and machine drawings.
CO4	Familiarize with the sectioning of solids and developments of surfaces of different solids. Knowledge of sheet metal fabrication of different mechanical component.

CO5	Ability to construction of isometric projection of different solids, castings etc. Knowledge of computer aided drawing and with the help of autocad software construction of machine component drawings.
BT-201 ENGINEERING PHYSICS	
CO1	Apply physical significance of gradient, divergence and curl on various surfaces in engineering physics
CO2	Determine various parameters related to laser, fibre optics and optics
CO3	Find position and momentum of free particle by schrödinger wave equation
CO4	Use characteristics of diodes and binding energy of nucleus in instrumentations
CO5	Apply behavior of electric and magnetic field on a nuclear particle in engineering
BT-202 ENGINEERING MATHEMATICS-II	
CO1	Introduce effective mathematical tools for the solution of ode.
CO2	Use of analytical method to second order differential equation in engineering problems.
CO3	Formulate the partial differential equations to solve engineering problem
CO4	Apply tools of differentiation and integration of function of complex variable that are used in various techniques dealing engineering problem.
CO5	Understand physical significance of gradient, divergence and curl in complex engineering problems.
BT-203 BASIC MECHANICAL ENGINEERING	
CO1	An ability to analyze basic properties of material its applications in industry, design and conduct experiments, as well as to analyze and interpret data.
CO2	Student will be able to describe the basic concept of metro logy,its working and application knowledge on industrial machines.
CO3	An ability to formulate, analyze properties of fluids, hydraulic machines to solve engineering problem.
CO4	Student will be able to apply concept of thermodynamics in modern engineering.
CO5	An ability to understand,design and evaluate the basic concept of i.c.engine its components.
BT-204 BASIC CIVIL ENGINEERING AND ENGINEERING MECHANICS	
CO1	Student should get general idea of selection of building materials for the components of building construction as per requirement of site.
CO2	Students should be able to get the concepts of surveying methods, results and surveying instruments in field.
CO3	Students should be able to do plotting of area traversed in field survey using conventional and modern techniques.
CO4	Students should be able to understand the use of principle of static and dynamics in civil engineering structures.
CO5	Students should be able to use centre of gravity and moment of inertia for finding complex cross sections.
BT-205 BASIC COMPUTER ENGINEERING	
CO1	Student should be able to understand the architecture of a computer with its various processing units. In addition to this student can understand memory management system of computer and also application of computer in real world.
CO2	Students should be able to understand basic knowledge of programming language, and acquire knowledge about the basic concept of how to write a program in c++.
CO3	Students should be able to understand various object oriented features like polymorphism, inheritance, object, classes and also able to learn about various data structures.

CO4	Students should be able to understand fundamental underlying principles of computer networking, network security threats, security measures and ethical issues related to the misuse of computer security.
CO5	Student should be able to learn about dbms concept, different data base languages, dba and key concepts of cloud computing.
BT-301 ENGINEERING MATHEMATICS-III	
CO1	To introduce effective mathematical tools for the numerical solution of algebraic and transcendental equations
CO2	Understand numerical differentiation and integration and use numerical techniques to find solution of linear system of equations.
CO3	Work numerically on ode and pde using different method through the theory of finite differences.
CO4	Discuss laplace transform, inverse laplace transform and fourier transform which are used in various branches of engineering.
CO5	To acquaint the student with mathematical tools available in statistics& probability used in various fields of science and engineering.
CS-302 DISCRETE STRUCTURES	
CO1	Apply the key concepts of set theory and also gain knowledge to computer logics.
CO2	Construct various algebraic structures.
CO3	Analyse method of representing mathematical propositional logic and its application.
CO4	Discuss graph theory concepts to solve complex problems.
CO5	Describe possets, hasse diagram and lattices with suitable example.
CS-303 DATA STRUCTURE	
CO1	Explain stack and queue data structures along with their merits and demerits
CO2	Use primitive operations on arrays, structures, stack and queue data structures.
CO3	Develop programs to perform primitive operations on linked lists.
CO4	Utilize dijkstra's algorithm to find spanning tree for a given graph.
CO5	Apply quick and merge sorting methods in problem solving.
CS 304 DIGITAL SYSTEMS	
CO1	Design and implement digital circuits of desired specifications.
CO2	Anlyse digital circuits for fault detection and correction.
CO3	Configure cost effective digital circuits used in memory system and control application.
CO4	Understand the difference between analog and digital circuits.
CO5	Know various digital ics available and their relative merits and demerits.
CS-305 OBJECT ORIENTED PROGRAMMING METHODOLOGY	
CO1	Implement encapsulation, abstraction of object oriented technology
CO2	Explain classes, their relationships and associativity of objects with classes.
CO3	Discuss various object oriented features like polymorphism, inheritance and abstract methods with example.
CO4	Perform operations with container classes and templates.
CO5	Perform the file operations with the help of various class library.
CS-306 COMPUTER WORKSHOP (JAVA)	
CO1	Explain basic architecture of java and capabilities of java language.
CO2	Illustrate basic concepts of object oriented programming and apply these concepts with the help of java language.
CO3	Update and retrieve the data from the database using jdbc connectivity.
CO4	Develop the graphical user interaction programs.

CO5	Demonstrate development of web based applications with the help of servlets and jsp.
BT-401 ENGINEERING MATHEMATICS-III	
CO1	Evaluation of complex integrals in engineering applications.
CO2	Use numerical methods to determine approximate solution in engineering.
CO3	Use interpolation technique to find functional values in engineering.
CO4	Solve given differential equations by methods of iteration.
CO5	Find correlation and probability frequency distribution of samples collected from field.
CS-402 ANALYSIS DESIGN & ALGORITHMS	
CO1	Evaluate space and time complexity of merge sort algorithms.
CO2	Use greedy strategy to find minimum spanning tree using prim's algorithm.
CO3	Apply backtracking techniques for solving eight-queens problem.
CO4	Implement branch and bound methods to solve traveling salesman problem.
CO5	Solve knapsack problem using dynamic programming algorithm.
CS-403 SOFTWARE ENGINEERING	
CO1	Compare software development models with their merits and demerits.
CO2	Construct software requirement specification with functional and non-functional requirements.
CO3	Apply boundary value analysis and equivalence partitioning testing techniques.
CO4	Calculate cyclomatic complexity for given program.
CO5	Apply cocomo model for estimating cost and efforts.
CS-404 COMPUTER ORGANIZATION AND ARCHITECTURE	
CO1	Analyze instruction execution cycle and addressing modes for computer processor.
CO2	Analyze computer arithmetic and types of micro-processor.
CO3	Describe i/o subsystems
CO4	Explain memory architecture with diagram
CO5	Interpret the use of parallel processing in uniprocessor system & multiprocessor architecture.
CS-405 OPERATING SYSTEM	
CO1	Compare various types of operating systems
CO2	Analyse fcfs, sstf, scan and look disk scheduling algorithm techniques
CO3	Implement fcfs, sjf, priority, rr cpu scheduling algorithm.
CO4	Summarize various memory management techniques.
CO5	Differentiate between remote procedure call and remote method invocation.
CS-406 PROGRAMMING PRACTICES (PYTHON)	
CO1	Analyse basic features of python and compare it with other programming language.
CO2	Implement primitive and derived data structures with python.
CO3	Implement structural and functional programming concept with python.
CO4	Implement object oriented programming concept with python.
CO5	Illustrate concurrent programming with python.
CS-501 THEORY OF COMPUTATION	
CO1	Compare deterministic and nondeterministic finite state machines.
CO2	Sketch finite state machine and push down automata on various types of languages
CO3	Classify various types of languages based on recognizer and generator
CO4	Explain recursive and recursively enumerable languages
CO5	Illustrate turing machine as a capacitor with its capabilities
CS-502 DATABASE MANAGEMENT SYSTEM	
CO1	Explain various data models with their merits and demerits.

CO2	Construct sql queries using various data manipulation statements.
CO3	Apply normalization upto 3nf on given relations.
CO4	Summarize concurrency control mechanism for database transactions.
CO5	Utilize triggers and cursors in pl/sql programming.
CS-503: CYBER SECURITY	
CO1	Classify cybercrime and analyse its challenges
CO2	Analyse cryptography with its various techniques
CO3	Analyse role of it act and strategies to apply it against cyber crime
CO4	Demonstrate digital signature with its component.
CO5	Analyse types and design principle for firewall.
CS-504: IWT INTERNET AND WEB TECHNOLOGY	
CO1	Describe the concepts of www including browser and http protocol
CO2	Use the various html tags to develop the user friendly web pages
CO3	Use css to provide the styles to the webpages at various levels.
CO4	Demonstrate characteristics of javascripts for dynamic web pages.
CO5	Develop the modern web applications with client side and server side technologies
CS-505: PYTHON	
CO1	Recall basic concept of programming with python.
CO2	Summarize primitive data structure in python and application.
CO3	Solve statistical problems using python library.
CO4	Analyse real world data using visualization methods.
CO5	Create and evaluate models for real world problems applicable in recent machine
CS-506 COMPUTER PROGRAMMING V (UNIX/LINUX LAB)	
CO1	Implement installation process for unix/linux.
CO2	Execute basic commands of linux os.
CO3	Analyse process states, process scheduling and scheduling priorities.
CO4	Implement file creation, file modification and file access permissions
CO5	Execute basic shell programming assignments
CS-601 MACHINE LEARNING	
CO1	Apply knowledge of computing and mathematics to machine learning problems, models
CO2	And algorithms
CO3	Analyse a problem and identify the computing requirements for ml model.
CO4	Design and implement an algorithm or ml model for accurate outcome.
CO5	Evaluate efficiency and related parameters of various ml models.
CS-602 COMPUTER NETWORK	
CO1	Explain computer network protocol hierarchy of osi and tcp/ip models.
CO2	Describe mechanisms of data link layer and related protocols to avoid collision and congestion.
CO3	Compare various data transmission protocol.
CO4	Evaluate efficiency of various routing algorithms.
CO5	Differentiate ipv4 and ipv6 internet protocol.
CS-603 COMPILER DESIGN	
CO1	Analyze the design of a compiler and the various phases of compiler
CO2	Develop lexical analysis phase and its underlying formal models
CO3	Illustrate syntax analysis phase and its various parsing techniques
CO4	Analyze importance of optimization among the various phases of compiler
CO5	Summarize compiler design concepts to generate powerful compiler tools

CS-604 PROJECT MANAGEMENT	
CO1	Understand the different activities in software project development
CO2	Demonstrate principles of modern software management
CO3	Illustrate life cycle phases of software management process
CO4	Understand project organization and responsibilities
CO5	Understand process planning and automation
CS-605 DATA ANALYTICS	
CO1	Understand the basic of data analytics using concepts of statistics and probability.
CO2	Understand the needs of data processing techniques.
CO3	Implement the data analytics techniques using r, matlab and python.
CO4	Apply the data analytics techniques in real life applications
CO5	Summarize data analytics with any case study of data science in healthcare or ecommerce
CS-606 SKILLS DEVELOPMENT	
CO1	Understand the basics of software as a product and product life cycle
CO2	Understand the current requirements of industries and develop required skills
CO3	Illustrate design phase and its various techniques contributing product development
CO4	Analyze importance of software development skills with respect to real life domains
CO5	Summarize skill set to generate powerful software products
CS-701 SOFTWARE ARCHITECTURE	
CO1	Describe the fundamental qualities and terminologies of software architecture.
CO2	Apply the fundamental principles and guidelines for software architecture design.
CO3	Architectural styles.
CO4	Interpret software architectural framework w.r.t. Real life domain development.
CO5	Use implementation techniques of software architecture leading to effective product
CS-702 BIG DATA	
CO1	Understand the concept and challenges of big data..
CO2	Demonstrate knowledge of big data analytics.
CO3	Develop big data solutions using hadoop eco system.
CO4	Gain hands-on experience on large-scale analytics tools.
CO5	Analyse the social network graphs
CS-703: CRYPTOGRAPHY AND INFORMATION SECURITY	
CO1	Understanding of the basics of cryptography and network security and working
CO2	Understanding of previous attacks on cryptosystems to prevent future attacks from
CO3	Knowledge about how to maintain the confidentiality, integrity and availability
CO4	Understanding of various protocols for network security to protect
CO5	Getting hands-on experience of various information security tools..
CS-706 MINOR PROJECT	
CO1	Perform functional requirement analysis of respective problem domain.
CO2	Design er diagram and dfd of proposed project work .
CO3	Utilize modern techniques and tools necessary for project work.
CO4	Write their project work and conclusions.
C05	Illustrate their project work through formal presentation.
CO6	Make a formal presentation of their project work and conclusions.
CS-801 INTERNET OF THINGS	
CO1	Understand internet of things and its hardware and software components
CO2	Design interface i/o devices, sensors & communication modules.
CO3	Analyse data from various sources in real-time

CO4	Monitor data and devices with remote control.
CO5	Develop real life iot based projects.
CS-802 BLOCKCHAIN TECHNOLOGIES(DEPT ELECTIVE)	
CO1	Understand concepts and terminology of blockchain.
CO2	Utilize block chain concepts for crypto currency application .
CO3	Classify block chain and compare the types for design issues.
CO4	Illustrate the block chain application development with simulator
CO5	Understand block chain enabled trade
CS-803 IMAGE PROCESSING AND COMPUTER VISION	
CO1	Understand practice and theory of computer vision
CO2	Elaborate computer vision algorithms, methods and concepts
CO3	Implement computer vision systems with emphasis on applications and problem Solving
CO4	Apply skills and algorithms for automatic analysis of digital images.
CO5	Design and implement real-life problems using image processing and computer vision..
CS-805 MAJOR PROJECT	
CO1	Identify functional and non-functional requirements for respective problem domain.
CO2	Design algorithmic solution for the proposed project work.
CO3	Utilize modern techniques and tools necessary for project work.
CO4	Organize project work and conclusions in document form
CO5	Demonstrate their project work through formal presentation.
AL301/CD301 TECHNICAL COMMUNICATION	
CO1	Analyse relevance and importance of communication in a globalized worlds.
CO2	Compare types of communication to overcome barriers to communicate
CO3	Develop writing and speaking skills with different tools
CO4	Prepare for job interviews with the help of self-assessment techniques
CO5	Apply advanced grammar to develop linguistic abilities.
CD-302 INTRODUCTION TO PROBABILITY AND STATISTICS	
CO1	Compute periodic functions by fourier series for simple analog communication system.
CO2	Apply laplace transform to analyse linear time-invariant systems.
CO3	Use series solution for second order differential equations in engineering problem.
CO4	Use partial differential equations (heat & wave equation) to solve complex engineering flow problems.
CO5	Understand physical significance of gradient, divergence and curl in complex engineering flow problems.
AL303/CD303 DATA STRUCTURES	
CO1	Explain stack and queue data structures along with their merits and demerits
CO2	Use primitive operations on arrays, structures, stack and queue data structures.
CO3	Develop programs to perform primitive operations on linked lists wrt data science scenario
CO4	Utilize dijkstra's algorithm to find spanning tree for a given graph.
CO5	Apply quick and merge sorting methods in problem solving related to data science and aiml applications
AL304 ARTIFICIAL INTELLIGENCE	
CO1	Compare artificial intelligence techniques a*, best first search, hill climbing.
CO2	Apply intelligent algorithm for problem solving

CO3	Analyse standard neural networks art, boltzmann machine.
CO4	Discuss types of learning and back propagation mechanism
CO5	Discuss evolutionary based algorithms and genetic algorithm modules for ai applications
CD304 DATABASE MANAGEMENT SYSTEM	
CO1	Explain various data models with their merits and demerits.
CO2	Construct sql queries using various data manipulation statements.
CO3	Apply normalization upto 3nf on given relations.
CO4	Summarize concurrency control mechanism for database transactions.
CO5	Utilize triggers and cursors in pl/sql programming.
AL305/CD305 OBJECT ORIENTED PROGRAMMING & METHODOLOGY	
CO1	Compare oop languages over conventional languages using the concept of object model wrt data science and ai applications
CO2	Implement the oop features encapsulation and abstraction with c++ classes.
CO3	Implement inheritance and its types with c++ and java programming.
CO4	Perform operations with container classes and templates for data science case study
CO5	Perform the file handling operations with the help of various class library.
CD-306 CW-PYTHON-I	
CO1	Explain basic architecture of java and capabilities of java language.
CO2	Illustrate basic concepts of object oriented programming and apply these concepts with the help of java language.
CO3	Update and retrieve the data from the database using jdbc connectivity.
CO4	Develop the graphical user interaction programs.
CO5	Demonstrate development of web based applications with the help of servlets and jsp.
AL401/CD401 INTRODUCTION TO DISCRETE STRUCTURES AND LINEAR ALGEBRA	
CO1	Apply the key concepts of set theory and also gain knowledge to computer logics.
CO2	Construct various algebraic structures.
CO3	Analyse method of representing mathematical propositional logic and its application.
CO4	Discuss graph theory concepts to solve complex problems.
CO5	Describe possets, hasse diagram and lattices with suitable example. Develop the concept of relation algebra,graph theory and functions
AL402/CD-402 ANALYSIS DESIGN & ALGORITHMS	
CO1	Evaluate space and time complexity of merge sort algorithms.
CO2	Use greedy strategy to find minimum spanning tree using prim's algorithm.
CO3	Apply backtracking techniques for solving eight-queens problem.
CO4	Implement branch and bound methods to solve traveling salesman problem.
CO5	Solve knapsack problem using dynamic programming algorithm.
CD-403 SOFTWARE ENGINEERING	
CO1	Compare software development models with their merits and demerits.
CO2	Construct software requirement specification with functional and non-functional requirements.
CO3	Draw dfd and erd for application software.
CO4	Apply boundary value analysis and equivalence partitioning testing techniques.
CO5	Calculate cyclomatic complexity for given program.
AL404 COMPUTER ORGANIZATION AND ARCHITECTURE/ CD504 COMPUTER ORGANIZATION AND ARCHITECTURE	
CO1	Analyse instruction execution cycle and addressing modes for computer processor.

CO2	Analyse computer arithmetic and types of micro-processor.
CO3	Describe i/o subsystems
CO4	Explain memory architecture with diagram
CO5	Interpret the use of parallel processing in uniprocessor system & multiprocessor architecture.
CD-404 INTRODUCTION TO DATA SCIENCE	
CO1	Analyse role of data scientist and applications of data science in various domains.
CO2	Apply data pre-processing techniques to sample matrix and dataset
CO3	Perform descriptive statistics method on numerical data
CO4	Develop regression model for prediction and decision making
CO5	Evaluate and test data science models for multiple performance parameters.
AL405 MACHINE LEARNING/ CD502 MACHINE LEARNING	
CO1	Apply knowledge of computing and mathematics to machine learning problems, models
CO2	And algorithms
CO3	Analyze a problem and identify the computing requirements for ml model.
CO4	Design and implement an algorithm or ml model for accurate outcome.
CO5	Evaluate efficiency and related parameters of various ml models.
CD405 OPERATING SYSTEM/AL501 OPERATING SYSTEM	
CO1	Compare various types of operating systems
CO2	Analyse fcfs, sstf, scan and look disk scheduling algorithm techniques
CO3	Implement fcfs, sjf, priority, rr cpu scheduling algorithm.
CO4	Summarize various memory management techniques.
CO5	Differentiate between remote procedure call and remote method invocation.
AL406 JAVA LAB	
CO1	Explain basic architecture of java and capabilities of java language.
CO2	Illustrate basic concepts of object oriented programming and apply these concepts with the help of java language.
CO3	Update and retrieve the data from the database using jdbc connectivity.
CO4	Develop the graphical user interaction programs for ai applications
CO5	Demonstrate development of web based applications with the help of servlets and jsp.
CD406 PYTHON-II LAB PYTHON FOR DATA SCIENCE	
CO1	Analyze basic features of python and compare it with other programming language.
CO2	Implement primitive and derived data structures with python.
CO3	Implement structural and functional programming concept with python.
CO4	Implement object oriented programming concept with python.
CO5	Illustrate concurrent programming with python.
AL502 DATABASE MANAGEMENT SYSTEM	
CO1	Understand the different issues involved in the design and implementation of a database System.
CO2	Study the physical and logical database designs, database modeling, relational, Hierarchical, and network models.
CO3	Understand and use data manipulation language to query, update, and manage a database
CO4	Summarize concurrency control mechanism for database transactions.
CO5	Design and build a simple database system and demonstrate competence.
AL503 INFORMATION RETRIEVAL	

CO1	Gain an understanding of the basic concepts and techniques in information retrieval
CO2	Understand how statistical models of text can be used to solve problems in ir
CO3	Appreciate the importance of data structures, such as an index, to allow efficient access to the information in large bodies of text
CO4	Build a document retrieval system, through the practical sessions
CO5	Understand the issues involved in providing an ir service on a web scale, including distributed index, recommendation engines.
AL504 NATURAL LANGUAGE PROCESSING	
CO1	Describe the fundamental concepts and techniques of natural language processing
CO2	Distinguish among the various techniques, taking into account the assumptions, strengths, and weaknesses of each
CO3	Use appropriate descriptions, visualizations, and statistics to communicate the problems and their solutions.
CO4	Build simple prototype for some ai application such as sentiment analysis
CO5	Analyze large volume text data generated from a range of real-world applications.
CD501 THEORY OF COMPUTATION	
CO1	Explain the basic concepts of switching and finite automata theory & languages..
CO2	Sketch finite state machine and push down automata on various types of languages
CO3	Classify various types of languages based on recognizer and generator
CO4	Explain recursive and recursively enumerable languages
CO5	Relate practical problems of data science to languages, automata, computability and complexity
CD503 INTRODUCTION TO TOOLKITS FOR DATA SCIENCE	
CO1	Develop relevant programming abilities for data science applications with toolkits.
CO2	Demonstrate proficiency with statistical analysis toolkits of data
CO3	Develop the ability to build and assess data-based models.
CO4	Execute statistical analyses with professional statistical software.
CO5	Apply data science concepts and methods to solve problems in real-world contexts

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE OUTCOMES(CO'S)

SECOND YEAR

BT-301 ENGINEERING MATHEMATICS-III	
CO1	Introduce effective mathematical tools for the numerical solution of algebraic and transcendental equations
CO2	Understand numerical differentiation and integration and use numerical techniques to find solution of linear system of equations.
CO3	Work numerically on ode and pde using different method through the theory of finite differences
CO4	Discuss laplace transform, inverse laplace transform and fourier transform which are used in various branches of engineering
CO5	Acquaint the student with mathematical tools available in statistics& probability used in various fields of science and engineering.
EC302 ELECTRONIC MEASUREMENT &INSTRUMENTATION	
CO1	To understand the basic concepts and definitions of various parameters of measuring devices, their operations and design of electronic instruments for the measurement of

	electric quantities viz. Current, voltage etc
CO2	To understand the construction and operation of oscilloscope, its basic circuit block and their functions and application and to study various ac bridges and q – meter
CO3	To acquire the knowledge of various transducers, their characteristics and applications for measurement of physical quantities.
CO4	Ability to understand the techniques used in signal generators and construction and working of various signal generators
CO5	Acquire knowledge of different adc and dac techniques their relative advantage and disadvantage and application in electronics instrumentation.
EC303 DIGITAL SYSTEM DESIGN	
CO1	To understand and examine the structure of various number systems, boolean algebra and its application in digital design
CO2	Understand and design various combinational circuits
CO3	Design various synchronous and asynchronous sequential circuits.
CO4	Analyze and design various registers and counters.
CO5	Classify different semiconductor memories and programmable logic devices
EC304 ELECTRONIC DEVICES	
CO1	Develop the knowledge of construction and characteristics of various semiconductors devices e.g. Diodes, transistors etc.
CO2	Utilize the applications of diodes.
CO3	Distinguish various types of diodes and know their salient parameters.
CO4	Acquire the knowledge of bipolar and unipolar transistors, their operations and working
CO5	Develop the knowledge of fet and its construction and characteristics.
EC305 NETWORK ANALYSIS	
CO1	Apply the concept of circuit elements, lumped circuits, circuit laws and reduction techniques.
CO2	Solve the electrical network using mesh and nodal analysis by applying network theorems.
CO3	Select appropriate and relevant technique for solving the electrical network in different
CO4	Analyze the transient response of series and parallel a.c. circuits in time domain using
EC306 EMI LAB	
CO1	To understand the basic concepts and definitions of various parameters of measuring devices, their operations and design of electronic instruments for the measurement of electric quantities viz. Current, voltage etc
CO2	To understand the construction and operation of oscilloscope, its basic circuit block and their functions and application and to study various ac bridges and q – meter
CO3	To acquire the knowledge of various transducers, their characteristics and applications for measurement of physical quantities.
CO4	Ability to understand the techniques used in signal generators and construction and working of various signal generators
CO5	Acquire knowledge of different adc and dac techniques their relative advantage and disadvantage and application in electronics instrumentation.
ES401 ENERGY & ENVIRONMENT ENGINEERING	
CO1	Develop an understanding of various sources of fossil fuel sources and energy storage.
CO2	Identify eco-systems and its importance in food chain.
CO3	Develop an understanding of biodiversity and its conservation at various levels.
CO4	Understanding causes of environmental pollution, and its control including disaster

	management.
CO5	Appreciation and understanding of sustainable development including various acts for prevention of pollution.
EC402 SIGNALS & SYSTEMS	
CO1	Applying the properties of ct and dt signals & systems, analysing ct systems in time domain using convolution
CO2	Analyse dt systems using z transforms and sketch rocs
CO3	Determine response of dt systems using convolution and its properties
CO4	Evaluating dt systems in the frequency domain using fourier analysis tools like
CO5	Design fir, iir discrete time systems and analyse state space equation for ct & dt
EC403 ANALOG COMMUNICATION	
CO1	Apply fourier analysis to communication signals and derive the energy or power spectral density of signals
CO2	Sketch the spectrum of amplitude modulated signals, given the baseband spectrum and analyzes various am techniques
CO3	Differentiate between narrow-band and wide-band angle modulation
CO4	Understand the concept of fm transmitters and receivers
CO5	Analyse the noise in various analog communication systems
EC 404 CONTROL SYSTEMS	
CO1	Understand the fundamentals of control systems
CO2	Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems
CO3	Express the time and frequency-domain responses of first and second-order systems
CO4	Determine the stability of a closed-loop control system
CO5	Apply root-locus technique to analyse and design control systems
EC405 ANALOG CIRCUITS	
CO1	Students are able to discuss and analyze feedback amplifiers and oscillator
CO2	Students are able to discuss differential amplifiers, characteristics of opamp and interpret data sheet
CO3	Students are able to design and analyze various circuits of opamp
CO4	Students are able to discuss, design and analyze the operation of 555 timer and its applications
CO5	Students are able to discuss various voltage regulator circuits implemented using opamp
EC406 SIMULATION LAB	
CO1	Develop program using tools in matlab
CO2	Use different library functions in matlab
CO3	Able to compare graphs in matlab software
CO4	Use matlab for research and development
CO5	Acquire knowledge of mathematical and simulation tools available in matlab
EC 501 MICROPROCESSOR & ITS APPLICATION	
CO1	apply the fundamentals of assembly language programming of microprocessor and microcontroller.
CO2	implement microcontroller and microprocessor interfaces including serial ports, adcs and dacs etc.
CO3	utilize hardware and software interaction and integration.
CO4	develop real time embedded systems using microprocessor
CO5	analyze microprocessor based digital circuits

EC 502 DIGITAL COMMUNICATIONS	
CO1	Develop the basic concept of random variables and apply the concept to different probability density function.
CO2	Design and develop the mathematics of sampling theorem and digital transmission of analog signals.
CO3	Implementation of different digital modulation techniques used in digital communication.
CO4	Develop the concept of optimum reception of digital signals and calculate the probability of error.
CO5	Analyze various parameters like information rate, entropy and channel capacity.
EC 503 CNTL	
CO1	Acquire knowledge of two port network & its design.
CO2	Acquire knowledge of passive lc filters & their applications. 3: acquire knowledge of transmission network & real functions.
CO3	Gain the knowledge for utilization of various fundamentals of transmission line.
CO4	analysis and distinguish between line & circuits.
CO5	Configure the skills on cables, wires & its application.
EC 504 (A) EMT (ELECTRO MAGNETIC (THEORY)	
CO1	Understanding the basic concepts of electromagnetic theory, scalar and vector quantities and various coordinate systems with electrostatic laws.
CO2	analyze electrical field intensity & potential, boundary conditions for electric field, measure different types of capacitances.
CO3	learn static magnetic fields, relation between magnetic flux and magnetic field intensity and their laws.
CO4	Understand self and mutual inductance; analyze energy stored in magnetic field, faraday's law and maxwell's equation.
CO5	Learn electromagnetic waves, study of waveforms in dielectric and conductors, polarization and reflection of em waves in different mediums.
EC 505 CNTL LAB	
CO1	Acquire knowledge of two port network & its design.
CO2	Acquire knowledge of passive lc filters & their applications. 3: acquire knowledge of transmission network & real functions.
CO3	Gain the knowledge for utilization of various fundamentals of transmission line.
CO4	analysis and distinguish between line & circuits.
CO5	Configure the skills on cables, wires & its application.
EC 506 MAT LAB PROGRAMMING	
CO1	Develop program using tools in matlab.
CO2	use different library functions in matlab.
CO3	able to compare graphs in matlab software.
CO4	Acquire knowledge of mathematical and simulation tools available in matlab.
CO5	Use matlab for research and development
EC-507 EVALUATION OF INTERNSHIP-II	
CO1	Explore career alternatives prior to graduation.
CO2	Integrate theory and practice.
CO3	Assess interests and abilities in their field of study.
CO4	Learn to appreciate work and its function in the economy.
CO5	Develop work habits and attitudes necessary for job success.
EC601 DIGITAL SIGNAL PROCESSING	

CO1	Design and analysis of discrete time system described by difference equation
CO2	Implement z transform and configure the block diagram of discrete system
CO3	Develop algorithm for discrete fourier series and discrete fourier transforms
CO4	Implement of fft algorithms
CO5	Implement and analysis the digital filter design techniques. Apply the knowledge gained in research and development in the field of dsp and image processing
EC602 ANTENNA & WAVE PROPAGATION	
CO1	Learn fundamental of antenna and radiation
CO2	Use of basic electrical and magnetic field radiation concepts applicable on wave propagation
CO3	Distinguish different type of antenna arrays and their radiation pattern
CO4	Learn antenna array synthesis
CO5	Design antenna operating at different frequencies for different applications and distinguish various modes of propagation
EC603 (A) DATA COMMUNICATION	
CO1	Acquire the knowledge of the fundamental concepts of data communication
CO2	Acquire the knowledge of the function of each layer in osi model
CO3	Gain core knowledge of error control and data link protocols
CO4	Study the basic knowledge to gain expertise in some specific area for network & frame relay
CO5	Study the basic taxonomy and terminology of the data communication and enumerate the
EC604 (A) MICROCONTROLLER & EMBEDDED SYSTEM	
CO1	Design adc and dac, stepper motor interfacing circuits
CO2	Describe the architecture and instruction set of 8096 microcontroller
CO3	Discuss about microcontrollers embedded processors and their applications
CO4	Describe the architecture of cisc, risc and arm microcontroller
CO5	Design i/o interfacing circuit of microcontroller
EC605 DATA COMMUNICATION LAB	
CO1	Acquire the knowledge of the fundamental concepts of data communication
CO2	Acquire the knowledge of the function of each layer in osi model
CO3	Gain core knowledge of error control and data link protocols
CO4	Study the basic knowledge to gain expertise in some specific area for network & frame relay
CO5	Study the basic taxonomy and terminology of the data communication and enumerate the
EC606 MICROCONTROLLER & EMBEDDED SYSTEM LAB	
CO1	Design adc and dac, stepper motor interfacing circuits
CO2	Describe the architecture and instruction set of 8096 microcontroller
CO3	Discuss about microcontrollers embedded processors and their applications
CO4	Describe the architecture of cisc, risc and arm microcontroller
CO5	Design i/o interfacing circuit of microcontroller
EC608 MINOR PROJECT II	
CO1	Utilize the skill set of system integration, presentation, documentation, project/workshop management, problem solving etc. To identify real life problem and resolve them
CO2	Implement the solution by designation proper hardware and software system
CO3	Judge & execute the problem analysis and develop qualities to work in a team

CO4	Create the leadership quality and develop skills for testing and troubleshooting
CO5	Design to present proper document of technical projects/workshop
EC701 VLSI DESIGN	
CO1	Configure the knowledge of mos & various technology in vlsi design.
CO2	Developed the skills on various devices modelling of active/passive semi component of mos.
CO3	Study the concept of circuit simulation & utilize the concept of various levels.
CO4	Develop their skills on design processing. Study of various register cells will be interpreted.
CO5	Apply the concept of cmos processing technology and helps to study latch up and its prevention techniques
EC702 (A) MICROWAVE ENGG	
CO1	Distinguish the propagation of different waves and modes in the rectangular waveguide
CO2	Calculate the parameter of different microwave components including ferrite devices
CO3	Develop use of different microwave sources and modulation scheme.
CO4	Utilize the use of different measuring equipment at microwave frequencies.
CO5	Develop knowledge for detection of faults in equipments used at microwave frequencies
EC703 (B) INTERNET OF THINGS	
CO1	Understand in depth about internet of things
CO2	Establish secure communication for his network for his devices connected in iot
CO3	Store his data securely on cloud and access it when required
CO4	Design web based application using various internet protocols and services
CO5	Use sensor technology and rfid and wireless networking for maintaining privacy and security concern in smart city and housing environment
EC706 MAJOR PROJECT-I	
CO1	Utilize the skill set of system integration, presentation, documentation, project/workshop management, problem solving etc. To identify real life problem and resolve them
CO2	Implement the solution by designation proper hardware and software system
CO3	Judge & execute the problem analysis and develop qualities to work in a team.
CO4	Create the leadership quality and develop skills for testing and troubleshooting.
CO5	Design to present proper document of technical projects/workshop.
EC 801 OPTICAL FIBER COMMUNICATION	
CO1	Interpret optical fiber, spectral bands and waveguides.
CO2	Distinguish led, laser diode and their typical characteristics.
CO3	Utilize working and design of the photo detectors.
CO4	Analyse circuit diagram and know the working of different types of optical receivers
CO5	Learn deployment of optical components in the field.
EC 802 (B) WIRELESS COMMUNICATIONS	
CO1	Develop the skills on wireless communication, its history, types & propagation mechanism.
CO2	Distinguish between various wireless channels, wideband & directional channel.
CO3	View the usage of various channel models, antenna & channels sounding.
CO4	Develop knowledge of signal processing and distinguish between errors in channels & study transceivers.
CO5	distinguish between various types of error in the channel and configure the

	skills on various diversities & covers the knowledge of various equalizers.
EC 803(A) WIRELESS NETWORK	
CO1	Distinguish wireless network topologies, wireless network operations and security of network.
CO2	Use the principle of mobile data networks: gprs, cdpd, gsm and their protocols.
CO3	Employ ieee 802.11 for wlans, management of sub layers
CO4	perform the concept of ieee 802.15 for wpan.
CO5	Implement the concept of optical network multiplexing (oadm) and concept of interference.
EC 804 ADV. COMM LAB	
CO1	Distinguish cdma, cellular cdma systems and multiuser detection.
CO2	Use of orthogonal frequency division multiplexing and related topics.
CO3	Interpret the multiple input multiple output antenna systems.
CO4	Distinguish transceiver architecture, interweaving and spectrum sharing.
CO5	Use concept of smart antennas.
EC 805 MAJOR PROJECT-II	
CO1	Do literature survey and identify projects aiming at real life problems.
CO2	Design and construct a hardware/ software system to meet desired requirements of the project selected.
CO3	Develop team work by making team mates work in groups.
CO4	Prepare the report so that they should have the idea of documentation in the prescribed format.
CO5	Implement the project keeping in mind the ethical values, safety and environment.

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES(CO'S)

SECOND YEAR

BT – 301 ENGINEERING MATHEMATICS-II	
CO1	Compute periodic functions by fourier series for simple analog communication system.
CO2	Apply laplace transform to analyze linear time-invariant systems.
CO3	Use series solution for second order differential equations in engineering problem.
CO4	Use partial differential equations (heat & wave equation) to solve complex engineering flow problems.
CO5	Understand physical significance of gradient, divergence and curl in complex engineering flow problems.
ME- 302 PRODUCTION PROCESS	
CO1	Utilise various measuring instruments for performing engg. Measurements.
CO2	Apply the knowledge of tool geometry and cutting forces in metal cutting.
CO3	Develop pattern and moulds in casting.
CO4	Apply the knowledge of tool geometry and cutting forces in metal cutting.
CO5	Select appropriate welding in fabrication process.
ME – 303 STRENGTH AND MECHANICS OF MATERIALS	
CO1	Distinguish different properties of materials and compute stress, strain and forces on determinant and indeterminate structures under axial loading conditions.
CO2	Analyse material under plane stress conditions

CO3	Compute stresses and analyse the structures such as beams, shafts and columns.
CO4	Analyse the machine parts for stress deformation and deformation under various loading conditions.
CO5	Apply the criteria of different theories of failure.
ME 304 THERMODYNAMICS	
CO1	Apply the basic concepts of thermodynamics in analysis of closed systems for heat and work transfer.
CO2	Apply the concepts of second law of thermodynamics and entropy change.
CO3	Analyze the fuel properties and combustion.
CO4	Evaluate thermodynamic properties of steam by using steam table and mollier chart.
CO5	Analyze the system based on air standard cycles.
ME- 305 MACHINE DRAWING AND DESIGN	
CO1	Draw the sectional views of machine components with desired dimensions and conventions
CO2	Draw the various joints , threads and bearings used in machines.
CO3	Draw the assembly view of ic engine and lathe machine parts from detailed drawings.
CO4	Develop the cad models of various machine components and assembly drawing with the help of cad software.
CO5	Apply the design consideration in development of the product,safe,reliable and standardized in application.
CO6	Design riveted,welded and threaded joints.
BE 306 CP-III JAVA	
CO1	Explain basic architecture of java and capabilities of java language.
CO2	Illustrate basic concepts of object oriented programming and apply these concepts with the help of java language.
CO3	Update and retrieve the data from the database using jdbc connectivity.
CO4	Develop the graphical user interaction programs.
CO5	Demonstrate development of web based applications with the help of servlets and jsp.
CO6	Execute the program with the feature of exception handling.
ME- 307 SELF STUDY	
CO1	Use the skill sets necessary for self-study
CO2	Apply the concepts of engineering and mathematics independently in problem solution.
CO3	Apply principles of ethics in commitment of responsibilities.
CO4	Organize their work independently with self-direction.
CO5	Develop independent problem solving skills
CO6	Implement the professional knowledge in solving problems more effectively and focused.
ME- 308 GROUP DISCUSSION / SEMINAR	
CO1	Apply the strategies of planning and time management.
CO2	Develop ideas relevant to the nature and significance of discussion
CO3	Organise his concepts of relevant subject matter for presentation
CO4	Summarize the points of discussion to arrive at conclusion
CO5	Challenge ideas of own and others to achieve better idea.
CO6	Explore better scope of problem solution.

BT – 401 ENGINEERING MATHEMATICS-III	
CO1	Evaluation of complex integrals in engineering applications.
CO2	Use numerical methods to determine approximate solution in engineering.
CO3	Use interpolation technique to find functional values in engineering.
CO4	Solve given differential equations by methods of iteration.
CO5	Find correlation and probability frequency distribution of samples collected from field.
CO6	Compare the mean & variance of samples by hypothesis testing
ME- 402 MATERIAL SCIENCE AND METALLURGY	
CO1	Implement the basic concepts of various categories of materials in different engineering applications.
CO2	Apply the concepts of plastic deformation of metals to achieve enhanced mechanical properties
CO3	Utilize the concept of phase diagrams and iron-carbon diagram in engineering applications.
CO4	Implement the principles of heat treatment for improvement in properties of metals.
CO5	Utilize various ferrous and non ferrous metals in technological applications
CO6	Implement the technological advancements to improve performance of engineering system and applications.
ME -403 THEORY OF MACHINES AND MECHANISMS	
CO1	Distinguish between different types of mechanisms, their motions and applications.
CO2	Analyse different mechanism on the basis of kinematic principles.
CO3	Analyse different types of gears on the basis of kinematic principles.
CO4	Draw cam profile for different cam and follower arrangements.
CO5	Illustrate gyroscopic effect and compute gyroscopic couple in the cases of ship, airplane and automobile.
CO6	Discuss kinematic analysis of different mechanisms employed in different machines.
ME – 404 THERMAL ENGINEERING & GAS DYNAMICS	
CO1	Prepare a heat balance sheet for a high pressure boiler and evaluate boiler performance.
CO2	Perform work done and efficiency calculations on phase change cycles.
CO3	Apply the concepts of gas dynamics in formulating relations for flow through variable area duct.
CO4	Calculate the value of minimum work input and volumetric efficiency of reciprocating air compressor.
CO5	Distinguish various heat exchangers and their relative characteristics
CO6	Apply the basic concepts of mathematics and thermal engineering in formulation of relation for performance of thermal systems.
ME-405 FLUID MECHANICS	
CO1	Apply the concepts of fluid statics and fluid properties in solution of numerical problems of pressure measurement and buoyancy effects of floating and submerged body.
CO2	Analyse a fluid flow field on kinematic basis.
CO3	Apply the principles of dynamics of fluid flow, energy and momentum equations in solution of fluid flow problems.

CO4	Analyse a model in a fluid field by using the principle of dimensional analysis.
CO5	Solve the engineering problems involving laminar flow through circular pipes and between parallel plates.
CO6	Apply the principles of fluid mechanics in design and analysis..
BE 406 COMPUTER PROGRAMMING-IV(.NET TECHNOLOGIES)	
CO1	Illustrate architecture of the .net framework, common language runtime (clr), framework class library.
CO2	Compare the advantages and disadvantages of procedural, event driven, and object oriented languages.
CO3	Apply advanced features interface,collections with c#
CO4	Develop interaction of front end with database using facilities of .net platform.
CO5	Design and implement desktop based windows applications using c#.
CO6	Utilize xml, javascript in the .net environment to create web based applications.
ME- 407 SELF STUDY	
CO1	Use the skill sets necessary for self study
CO2	Apply the concepts of engineering and mathematics independently in problem solution.
CO3	Apply principles of ethics in commitment of responsibilities.
CO4	Organize their work independently with self direction.
CO5	Develop independent problem solving skills
CO6	Implement the professional knowledge in solving problems more effectively and focused.
ME- 408 GROUP DISCUSSION / SEMINAR	
CO1	Apply the strategies of planning and time management.
CO2	Develop ideas relevant to the nature and significance of discussion.
CO3	Organise his concepts of relevant subject matter for presentation.
CO4	Summarise the points of discussion to arrive at conclusion.
CO5	Challenge ideas of own and others to achieve better idea.
CO6	Explore better scope of problem solution.
ME- 501 ENTREPRENEURSHIP AND MANAGEMENT CONCEPTS	
CO1	Apply concepts of system and its key components in organisational structure.
CO2	Apply concepts of management, planning, decision making and perform swot analysis.
CO3	Communicate effectively to achieve marketing goals and perform bep and financial ratio analysis.
CO4	Apply the concept of tqm and lean manufacturing.
CO5	Use the concepts of entrepreneur traits and perform opportunity analysis.
CO6	Function effectively as an individual and as a member or leader of a team in an organisation.
ME- 502 TURBO MACHINERY	
CO1	Apply the basic principle of thermodynamic in analysis of turbomachines.
CO2	Evaluate the performance of steam turbine for varying condition of steam and blade design.
CO3	Design and evaluate the performance of water turbine and centrifugal pumps .
CO4	Draw the vector diagram for fans,blower and compressor to calculate the workdone and efficiency.
CO5	Apply the general theory of turbo machines in various positive displacement machines and hydraulic system application.

CO6	Implement the concepts of thermodynamic,fluid mechanics and mathematical formation of turbomachines.
ME- 503 MECHANICAL MEASUREMENTS AND CONTROL	
CO1	Implement basic concept of meteorology and its various fundamental techniques.
CO2	Distinguish the measuring instruments for the level of precision and accuracy.
CO3	Apply statistical approach in measurement systems.
CO4	Use the appropriate type of measuring instrument according to requirements of measurement.
CO5	Apply various scientific instruments used for the measurements of strain, stress, torque, velocity etc. To identify load calculation.
CO6	Apply electromechanical measuring instruments with appropriate configuration in machines and systems.
ME- 504 MACHINE COMPONENT DESIGN	
CO1	Design a mechanical element according to the causes of stress concentration due to change in regular cross section.
CO2	Implement the designing and selection procedure of machine shaft by considering the is standards
CO3	Apply the design procedure of helical spring and power screw for the said application in industries
CO4	Design the braking system parts and friction clutch elements.
CO5	Calculate the bearing forces for selection of bearing from manufacturer's catlogue.
CO6	Apply the designing methods for simple machine components by following the usual practice of design data book.
ME -505 DYNAMICS OF MACHINES	
CO1	Analyse single slider crank mechanism and flywheel on the basis of dynamic principles.
CO2	Analyse different types of governors on the basis of dynamic principles.
CO3	Perform balancing of rotary and reciprocating masses.
CO4	Apply the principles of friction on bearings, clutches and brakes.
CO5	Analyse belt and rope drives for power transmission.
CO6	Discuss the dynamic analysis of different mechanisms and machines.
BE 506 DATABASE MANAGEMENT SYSTEM	
CO1	Explain rdbms, hierarchical and network data model with their merits and demerits.
CO2	Construct sql queries using ddl statements.
CO3	Illustrate e-r diagrams and normalization using suitable examples
CO4	Summarize database transaction and related database facilities including concurrency control, backup and recovery
CO5	Explain various issues related with distributed database management system
CO6	Execute dml queries with suitable examples.
ME- 507 SELF STUDY	
CO1	Apply the skill sets necessary for self study.
CO2	Apply the concepts of engineering and mathematics independently in problem solution.
CO3	Apply principles of ethics in commitment of responsibilities.
CO4	Organize their work independently with self direction.
CO5	Develop independent problem solving skills
CO6	Implement the professional knowledge in solving problems more effectively and

	focused.
ME- 508 GROUP DISCUSSION / SEMINAR	
CO1	Apply strategies of effective time management.
CO2	Adapt appropriate strategy of presentation of subject matter.
CO3	Develop ideas using the own thinking or ideas of others.
CO4	Acquire ideas from discussion.
CO5	Challenge ideas of own or ideas of others to arrive at better conclusion.
CO6	Explore better scope of problem solving and goal attainment.
ME- 601 OPERATIONS MANAGEMENT	
CO1	Apply concepts of management on different operations of an industry.
CO2	Design a product by applying advanced concepts of product design.
CO3	Analyse reliability, maintainability and productibility of a product in an industry.
CO4	Apply the major concepts in the major areas of quality of a product and its production process.
CO5	Apply the concept of optimization to allocate different plant facilities.
CO6	Apply decision-support tools to business decision making.
ME- 602 POWER PLANT ENGINEERING	
CO1	Distinguish various methods of converting energy sources to electric power.
CO2	Implement the design principles of thermal power stations in making calculations for system components.
CO3	Use the principles of nuclear energy conversion for safe, reliable and economics electric energy conversion in indian context.
CO4	Apply the hydrological computation for design of hydraulic turbine.
CO5	Estimate the load calculation for domestic and industrial uses of electricity.
CO6	Estimate and compute simple problems on cost analysis, economic performance and tariffs.
ME- 603 METAL CUTTING & CNC MACHINE	
CO1	Apply the principle of metal cutting with appropriate tool and tool geomatery on lathe machine.
CO2	Select the grinding machine with appropriate grinding wheel for specific grinding operation.
CO3	Identify different types of milling machine and select a machine for making a job.
CO4	Distinguish between drilling and broaching machine and their application.
CO5	Apply the knowledge of machining on shaper, gear cutting and rating of machined surface.
CO6	Apply the knowledge of mechatronics in machining operation.
ME- 604 I.C. ENGINES	
CO1	Determine engine dimensions and other operating parameters with the help of mathematical equations.
CO2	Apply the principle of combustion in s.i. engines for determination of effect of detonation on engine and its remedy.
CO3	Apply the concepts of combustion in c.i. engines for solving problems on design of various types of combustion chambers.
CO4	Solve numerical problems pertaining to various i.c. engine systems.
CO5	Apply the principle of supercharging in i.c. engines for its performance analysis.
CO6	Analyse an i.c. engine for its performance and design modification.
ME- 605 HEAT AND MASS TRANSFER	
CO1	Apply the concepts of heat transfer to analyse the heat transfer problems based on

	conduction mode.
CO2	Implement the mathematical models for extended surfaces and unsteady heat conduction for the solution of engineering problems
CO3	Develop correlations for different heat transfer problems using dimensional analysis
CO4	Design the heat exchanger
CO5	Utilize the principles of mass transfer in solving problems involving mass diffusion
CO6	Analyse the problems of heat transfer by radiation mode , boiling and condensation.
ME- 606 COMPUTER AIDED ENGINEERING	
CO1	Solve complex engineering problems using mathematical models.
CO2	Apply the concepts of static and dynamics analysis for solving complex engineering problems.
CO3	Apply the different principle of meshing for obtaining solutions by finite element methods.
CO4	Apply the techniques of post processing in engineering problems to obtain results.
CO5	Develop the design of mechanical components with consideration of criteria of failure.
CO6	Apply methods of solving engineering problems analytically, numerically and experimentally in getting solution with useful information
ME- 607 SELF-STUDY	
CO1	Apply the skill sets necessary for self-study.
CO2	Apply the concepts of engineering and mathematics independently in problem solution.
CO3	Apply principles of ethics in commitment of responsibilities
CO4	Organize their work independently with self-direction.
CO5	Develop independent problem solving skills
CO6	Implement the professional knowledge in solving problems more effectively
ME – 608 SEMINAR AND GROUP DISCUSSION	
CO1	Apply strategies of effective time management
CO2	Adapt appropriate strategy of presentation of subject matter
CO3	Develop ideas using the own thinking or ideas of others
CO4	Acquire ideas from discussion.
CO5	Challenge ideas of own or ideas of others to arrive at better conclusion
CO6	Explore better scope of problem solving and goal attainment.
ME- 701 WORKSTUDY AND ERGONOMICS	
CO1	Apply the principle of work-study in development of improved working procedure
CO2	Analyse the work contents, rate a worker, calculate the wages and implement the incentive wage plan.
CO3	Analyse and calculate time for any job or work, consideration of different types of allowances.
CO4	Evaluate the occupational environment factors like stress, noise and vibration in the industry level.
CO5	Use the various display system and apply them in industry.
CO6	Apply the concepts of work-study &ergonomics to increase the productivity & reduce cost of production.

ME -702 RENEWABLE ENERGY SYSTEM	
CO1	Apply concepts of solar radiation in solar photovoltaic and solar thermal applications.
CO2	Interpret the wind energy characteristics for wind energy applications.
CO3	Apply the method of biomass production for design and operation of biogas plant.
CO4	Distinguish hydro power systems and their components in power generation and principle of ocean energy.
CO5	Apply the principles of geothermal energy and hydrogen energy in power generation.
CO6	Apply the methods of non-conventional energy generation to generate power with consideration of environmental protection to give benefit to individual, society and industry
ME – 703 MECHANICAL VIBRATION AND NOISE ENGINEERING	
CO1	Analyse the vibrating mass under the action of simple harmonic forces.
CO2	Analyse under damped, over damped and critically damped systems and solve problems on damped free vibrations.
CO3	Examine the systems under transverse vibrations.
CO4	Examine the natural frequency of vibrations of systems with two degree of freedom.
CO5	Apply the noise control techniques in domestic and industrial applications.
CO6	Analyse a vibratory system to determine natural frequency by using rayleigh's method.
ME- 704 AUTOMOBILE ENGINEERING	
CO1	Optimize the vehicle body design and frame structure for the safety of vehicle.
CO2	Apply the principle of wheel alignment and balancing the estability of the vehicle
CO3	Distingush transmission system used in various automobiles and estimate application of slip.
CO4	Implement the concept of suspension in application of dampers and springs in vehicles.
CO5	Identifiy the appropriate braking and suspension system in particular automobiles.
CO6	Analyse the emission system of an automobile.
ME- 705 OR & SUPPLY CHAIN	
CO1	Apply linear system and distribution models being used in linear programming for two variables and apply special cases of transportation &assignment.
CO2	Apply supply chain management and optimization techniques in industry
CO3	Apply knowledge of inventory models. Mrp techniques and e-business
CO4	Analyse queue line models and competitive strategy for solution of game theory problems.
CO5	Analyse decision, risk probability and uncertainty.
CO6	Analyse linear system and distribution models, supply chain management techniques and inventory models.
ME- 706 MINOR PROJECT	
CO1	Apply knowledge of mechanical engineering subjects in handling engineering projects.
CO2	Apply appropriate tools and technique in modelling of complex mechanical engineering problems.
CO3	Incorporate the environmental, safety and health considerations in solving problems.

CO4	Perform effectively as an individual or leader of a team in execution of engineering project.
CO5	Apply communication skills in the form of preparing reports and presentation.
CO6	Devise product to fulfill the technological needs of the society or industry with consideration of professional norms.
ME- 707 INDUSTRIAL TRAINING	
CO1	Apply knowledge of mechanical engineering to formulate and development of solutions of industrial oriented problems.
CO2	Apply practical approach for solution of industrial problems.
CO3	Write report and also able to communicate outcomes of important findings in appropriate forms.
CO4	Perform activities in an engineering task both as individual and team member.
CO5	Recognize the sources of hazards in industrial activities and provide possible remedial solutions.
CO6	Conduct engineering activities in accordance with ethics and norms of engineering practice for sustainable development of society.
ME -801 ENERGY MANAGEMENT & AUDIT	
CO1	Apply concepts of energy management in various sectors of energy use.
CO2	Perform energy audit and prepare report
CO3	Use the methods for preparing material energy balance and energy action plan.
CO4	Apply the energy management concepts in electrical utilities.
CO5	Apply concepts of energy conservation in thermal utilities used in plants.
CO6	Perform energy audit for setting up effective energy management system in industry
ME- 802 MACHINE DESIGN	
CO1	Design the belt,chain and rope drives for given application
CO2	Implement the design procedure for a gear drive for required velocity ratio.
CO3	Calculate the forces acting on the i.c. engine parts.
CO4	Estimate the cost of designing, material selection for simple machine elements.
CO5	Develope the optimized design of an engineering application.
CO6	Apply the designing procedure in assembly design and spare part replacement in case of worn out machine element.
ME- 803 REFRIGERATION AND AIR CONDITIOING	
CO1	Apply the basic concepts of refrigeration and thermodyanamic cycle for numeric solution of refrigeration system.
CO2	Draw the thermodynamics process of vapour compression cycle on p-h and t-s diagrams and use them for solutions of problems.
CO3	Apply the principles of vapour absorption refrigeration system, steam-jet refrigeration and properties of refrigerants in design and performance estimation of refrigeration system.
CO4	Draw psychrometric processes using psychrometric properties and solve numeric problem of air conditioining systems.
CO5	Calculate the load for air conditioning system at various weather conditions.
CO6	Design and analysis refrigeration and air conditioing system for efficient and safe working.
ME- 804 CAD/CAM/CIM	
CO1	Apply the concept of computer integrated manufacturing in industrial production.
CO2	Develop graphical model using basic tools of transformation of geometry.

CO3	Construct solid geometry the form of two dimensional and three dimensional models using basics of geometric modelling.
CO4	Apply the principles of numerical control machines and preparation of part program using preparatory and miscellaneous codes.
CO5	Distinguish batch and job shop production and apply the production flow analysis and computer aided process planning (capp) in production processes.
CO6	Apply the principles of cad, cam and cim in industrial environment for optimization of design and processess.
ME- 805 MAJOR PROJECT	
CO1	Illustrate the research requirements for technological advancement on the basis of review of previous researches.
CO2	Develop mathematical model based on scientific principles.
CO3	Execute the project work as a team member and team leader as well.
CO4	Plan and manage activities of a project work for cost effective and timely completion of work.
CO5	Practice the professional activities with due consideration of ethics, health, safety and legal issues.
CO6	Display and communicate results of project work in terms of reports, presentation and documents.
ME- 806 SEMINAR / GROUP DISCUSSION	
CO1	Apply strategies of effective time management.
CO2	Adapt appropriate strategy of presentation of subject matter.
CO3	Communicate effectively in professional environment..
CO4	Acquire ideas from discussion.
CO5	Challenge ideas of own or ideas of others to arrive at better conclusion.
CO6	Explore better scope of problem solving and goal attainment.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE OUTCOMES(CO'S)

SECOND YEAR

BT-301 ENGINEERING MATHEMATICS-III	
CO1	Introduce effective mathematical tools for the numerical solution of algebraic and transcendental equations
CO2	Understand numerical differentiation and integration and use numerical techniques to find solution of linear system of equations.
CO3	Work numerically on ode and pde using different method through the theory of finite differences
CO4	Discuss laplace transform, inverse laplace transform and fourier transform which are used in various branches of engineering
CO5	Acquaint the student with mathematical tools available in statistics& probability used in various fields of science and engineering.
EX 303 ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS	
CO1	Understand basic concept of electrical measuring instruments.
CO2	Explain types of electrical measuring instruments.
CO3	Analyse different applications of measuring instrument transformer.
CO4	Evaluate the performance of energy meter.

CO5	Select appropriate instrument for measuring electrical parameters.
EX304 NETWORK ANALYSIS	
CO1	Describe the concept of different transient and steady state approaches of ac and dc networks.
CO2	Apply graph theory techniques for analyzing electrical networks.
CO3	Apply network theorems in different electrical circuits.
CO4	Analyze time and frequency concepts of laplace transform.
CO5	Evaluate two port parameters of various networks.
EX402 ELECTRICAL MACHINE-I	
CO1	Remember basic features of electrical machine.
CO2	Understand the detailed features including performance of three phase transformer.
CO3	Illustrate construction and operation of im.
CO4	Analyse performance of im.
CO5	Evaluate the performance of various rotating single phase machine.
EX404 POWER SYSTEM-I	
CO1	An understanding basics of electrical power generations from conventional and non-conventional sources of energy.
CO2	To introduce the students to the general structure of the network for transferring power from generating stations to the consumers.
CO3	To expose the students to the different electrical & mechanical aspects of the power network along with its environmental and safety constraints.
CO4	To familiarize the students with the price structure of indian power market.
CO5	Access overvoltage in transmission system and their control.
EX405 CONTROL SYSTEM	
CO1	Classify different types of control system.
CO2	Analyse time response of a control system to various input signals.
CO3	Examine stability of a control system using time domain analysis methods.
CO4	Evaluate stability of a control system using time domain analysis methods.
CO5	Design different compensating networks for a given system.
EX 501 ELECTRICAL MACHINE-II	
CO1	Acquire knowledge about the constructional details and principle of operation of alternators and dc machines.
CO2	Acquire knowledge about the working of synchronous machines and dc machines as generators and motors.
CO3	Acquire knowledge about testing and applications of synchronous machines and dc machines.
CO4	Formulate and then analyze the working of electrical machines using mathematical model under loaded and unloaded conditions.
CO5	Acquire knowledge about controlling of synchronous machines and dc machines.
EX 502 POWER ELECTRONICS	
CO1	Understand characteristics of power semiconductor devices.
CO2	Demonstrate operation of uncontrolled & controlled rectifiers.
CO3	Analyze waveforms of dc to ac converter circuits.
CO4	Distinguish different chopper circuits.
CO5	Summarize the ac voltage controllers & cycloconverter.
EX 503 DEPARTMENTAL ELECTIVE –I ELECTRICAL POWER GENERATION	

& ECONOMY	
CO1	Understand the basic features and laws related to electric power generation.
CO2	Apply the theory and practices in conventional power generation methods.
CO3	Analyze the operation, maintenance and working of non conventional power plants.
CO4	Compare the operation, maintenance and working of conventional and non conventional substations.
CO5	Investigate the practices of various power plants in reference to economy.
EX 504 OPEN ELECTIVE –I (ELECTROMAGNETIC THEORY)	
CO1	Apply vector calculus to understand the behavior of static electric fields.
CO2	Analyze the behavior of conductors, insulator & dielectrics in electric fields.
CO3	Comprehend the behavior of static magnetic fields using vector calculus.
CO4	Understand the nature of time varying fields and derive em wave equation.
CO5	Examine the phenomena of wave propagation in different media and its using maxwell's
EX-701 POWER SYSTEM PROTECTION	
CO1	Understanding of various abnormal conditions in power system.
CO2	Interpret protective devices in power system.
CO3	Analyze the performance of circuit breakers.
CO4	Compare various conventional relays for protection of power system.
CO5	Discriminate different types of lightning arrester.
EX-702 DEPARTMENTAL ELECTIVE (HIGH VOLTAGE ENGINEERING)	
CO1	Discus high voltage technology, merits/demerits, limitations and its applications.
CO2	Explain electrical breakdown phenomena in gases, liquids and solids, related theories for given fields.
CO3	Analyse the performance of electronics instruments regarding different input signals.
CO4	Evaluate the test measurement techniques of high dc, ac and impulse voltage and current.
EX-703 OPEN ELECTIVE (ENERGY AUDIT & MANAGEMENT)	
CO1	Assess the need for energy auditing and energy & power scenario of the world.
CO2	Evaluate the impact of power factor on various electrical systems.
CO3	Compute the efficiency of various thermal systems.
CO4	Apply energy conservation techniques in major utilities.
CO5	Apply energy economics in various electrical & mechanical systems.
EX-801 ELECTRICAL DRIVES	
CO1	Investigate the control of dc motors by single/multiple phase converters.
CO2	Distinguish the operation of dc drives through choppers.
CO3	Compare the control of induction motor drives from stator side by various methods.
CO4	Evaluate control techniques for providing efficient control of induction motor drives from rotor side.
CO5	Classify the control strategies of synchronous motors by vsi, csi and cycloconverters.
EX-802 DEPARTMENTAL ELECTIVE (POWER QUALITY PROBLEMS AND MITIGATION TECHNIQUES)	
CO1	Understand the severity of power quality problems in distribution system.
CO2	Apply the theory and practices that cause power quality problems rectification.

CO3	Analyse the working and operation of unified power quality compensators.
CO4	Evaluate the power quality problems caused by voltage sags and interruption.
CO5	Investigate how to mitigate the different types of power quality problems.
EX-803 OPEN ELECTIVE (POWER ELECTRONICS CONVERTERS FOR RENEWABLE ENERGY)	
CO1	Assess the world energy scenario and impact of solar energy on it.
CO2	Explain the power conversion techniques for solar energy.
CO3	Analyse the various triggering techniques for power converters.
CO4	Explain the basics of wind energy systems.
CO5	Analyse the controlling of wind generators.

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES(CO'S)

SECOND YEAR

BT-301 ENGINEERING MATHEMATICS-III	
CO1	Application of effective mathematical tools for the numerical solutions of algebraic and transcendental equations
CO2	To enable technocrats to acquire mathematical knowledge for understanding laplace transformations, inverse laplace transformation, and fourier transform used in engineering
CO3	Application of mathematical tools available in statistics needed in engineering
CO4	Use partial differential equations (heat & wave equation) to solve complex engineering flow problems.
CO5	Understand physical significance of gradient, divergence and curl in complex engineering flow problems.
CE302 CONSTRUCTION MATERIALS	
CO1	Utilization of various construction materials -stones, bricks mortar and concrete
CO2	Utilization of various construction materials-timber, glass, steel and aluminium
CO3	Application and use of different flooring materials, roofing, plumbing and sanitary materials
CO4	Use of paints, enamels and varnishes in civil construction
CO5	Utilization of various construction materials-bitumen, tar and asphalt
CE303 SURVEYING	
CO1	Classification and methods of surveying & levelling
CO2	Use of trigonometric levelling & use of the odolite traversing
CO3	Principles of tachometry and its use in surveying
CO4	Classification and use of cuves
CO5	Methods of hydrographic surveys and photographic surveying
CE304 BUILDING PLANNING & ARCHITECTURE	
CO1	Drawing of building elements
CO2	Planning & classification of buildings,
CO3	Making use of different services in building
CO4	Principles of architectural design
CO5	Drawing of perspective drawing, town planning including master plan
CE305 STRENGTH OF MATERIALS	
CO1	Analysis of simple stress and strains

CO2	Analysis of bending and shearing stresses
CO3	Determination of slope and deflection of beam by different methods
CO4	Design of column and its classification
CO5	Analysis of toson of shaft
CE306 STUDY OF HISTORICAL & ANCIENT CIVIL ENGINEERING PRACTICES	
CO1	General study of ancient monuments
CO2	Evaluation of environmental practices adopted in construction of historical structures
CO3	Evaluation of construction techniques and materials used in historical structures
CO4	Planning of historical structures
CO5	Visit of historical structures and museums to understand history of civil engineering practices
ES401 ENERGY & ENVIRONMENT ENGINEERING	
CO1	Develop an understanding of various sources of fossil fuel sources and energy storage
CO2	Identify eco-systems and its importance in food chain
CO3	Develop an understanding of biodiversity and its conservation at various levels
CO4	Understanding causes of environmental pollution, and its control including disaster management
CO5	Appreciation and understanding of sustainable development including various acts for prevention of pollution
CE402 CONSTRUCTION TECHNOLOGY	
CO1	Design features of various type of foundation and their usages
CO2	Design and construction of various types of form work
CO3	Develop an understanding of biodiversity and its conservation at various levels
CO4	Understanding causes of environmental pollution, and its control including disaster management
CO5	Appreciation and understanding of sustainable development including various acts for prevention of pollution
CE403 STRUCTURAL ANALYSIS I	
CO1	Application of virtual work applied to deformable bodies and analysis of pin-jointed frames for static loads
CO2	Determination of indeterminacy of static and kinematics, analysis of fixed and continuous beams
CO3	Analysis of beam and frames by slope deflection method
CO4	Analysis of three hinged arches of different shapes, suspension cable, two hinged arches
CO5	Analysis of rolling loads and influence lines for determinate structures
CE404 TRANSPORTATION ENGINEERING	
CO1	Evaluation of transportation by roads, railways, airways, waterways their importance and limitations
CO2	Geometric design of roads and railway track
CO3	Investigation and planning of bridge site and various standards for road and rails bridges
CO4	Analysis of bridge foundation, construction, and strengthening of bridges
CO5	Compare methods of construction of tunnels and engineering survey

CE405 ENGINEERING GEOLOGY& REMOTE SENSING	
CO1	Application of engineering geology for engineering projects
CO2	Analysis and evaluation of properties of minerals
CO3	Application of structural geology to civil engineering
CO4	Application of hydro-geology for ground water
CO5	Evaluating uses of remote sensing for civil engineering applications
CE406 SOFTWARE LAB(AUTOCAD)	
CO1	Understand and make use of commands of auto cad
CO2	Apply various commands of auto cad
CO3	Analyse 3 d modelling with auto cad
CO4	Applying drawing symbols and attributes, layer command
CO5	Making use of auto cad for plan, section and elevation of a 1 bhk house
CE501 FLUID MECHANICS I	
CO1	Analysis of fluid properties and buoyant forces
CO2	Develop continuity equation for flow and identify different types of flow
CO3	Measurement of flow and derivation and application of bernoulli's equation
CO4	Analyse laminar flow and stroke's law
CO5	Dimensional analysis and use of buckingham pi theorem
CE502 TRANSPORTATION ENGINEERING II	
CO1	Planning of high way, its principles and cross sectional elements
CO2	Design of flexible pavement/rigid pavement
CO3	Construction of low cost roads, drainage, traffic engineering
CO4	Planning of airport, runway & taxiway
CO5	Design of lightning system, traffic control and obstructions
CE503	
CO1	Analyze different types of estimate and principles of working out qtys
CO2	Create rate analysis of different items of civil works
CO3	Preparation of detailed estimate of various types of buildings
CO4	Assessment of factors affecting cost of work and preparation of dpr
CO5	Preparation of valuation of buildings and rent fixation
CE504 URBAN & TOWN PLANNING	
CO1	Planning of urban areas into various zones
CO2	Implementation of planning of urban areas through various agencies
CO3	Planning of zoning and land use. Building by laws
CO4	Traffic management and legal issues involved in planning and professional practice
CO5	Analysis of different type of development plans
CE505 QUANTITY SURVEYING & COSTING (LAB)	
CO1	Preparation of detailed estimate
CO2	Preparation of detailed estimate for services
CO3	Preparation of rate analysis for different items of construction
CO4	Preparation of dpr for engineering projects
CO5	Preparation of estimate for earthwork of road
CE506 MATERIAL TESTING LAB	
CO1	Conduct various tests on cement
CO2	Evaluate fineness modulus of fine aggregate and coarse aggregate
CO3	Mix design by is code method
CO4	Slump test for workability of concrete

CO5	Compressive strength of concrete and also flexural strength of concrete
CE601 STRUCTURAL DESIGN & DRAWING (RCC-1)	
CO1	Evaluation of various methods of design of structure
CO2	Design of beam
CO3	Design of slabs
CO4	Design of column & footings
CO5	Design of staircase of different types
CE602 ENVIRONMENTAL ENGINEERING	
CO1	Estimation of ground and water resources
CO2	Analysis of water
CO3	Application of various methods for water treatment
CO4	Design of sewer, its construction and maintenance
CO5	Analysis of waste water and its disposal
CE603 WATER RESOURCE ENGINEERING	
CO1	Estimate of irrigation water requirement for various crops
CO2	Utilization of ground water for irrigation, advantages and disadvantages
CO3	Evaluate hydrological cycle including rain gauges and their application for collection of data
CO4	Construction of canal and other hydraulic structures
CO5	Probability and frequency analysis for flood, flood control measures and its economics
CE604 ENVIRONMENTAL IMPACT ASSESSMENT	
CO1	Utility and scope and application of eia
CO2	Evaluation of methods for eia
CO3	Assessment of impact on air, water, noise and socio-economic environment
CO4	Organization and planning of information and documentation
CO5	Evaluation of public participation in environmental decision making
CE605 ADVANCE SURVEYING LAB	
CO1	Utilize cross staff and chain for locating various objects
CO2	Make use of compass for finding bearing of sides of traverse
CO3	Make use of dumpy level for determination of elevation of various points
CO4	Make use of the odolite for finding vertical angle and for traversing
CO5	Make use of total station for survey
CE606 NON-DESTRUCTIVE TESTING LAB	
CO1	Making use of rebound hammer test
CO2	Making use of upv test
CE701 GEOTECHNICAL ENGINEERING	
CO1	Classification of soils and determination of index properties
CO2	Analysis of permeability, construction of flow nets
CO3	Analysis of stress distribution in soil and use of compaction in construction
CO4	Classification of consolidation and its application in geotechnical engineering
CO5	Analysis and determination of shear strength of soil and stabilization of soils
CE702 (B) ENVIRONMENTAL ENGINEERING II	
CO1	Design and theory of preliminary treatment such as screeds, grit chamber, sedimentation and chemical clarification
CO2	Application of biological treatment for waste water treatment
CO3	Application of advanced techniques for waste water treatment
CO4	Classification and characteristics of air pollution

CO5	Analysis of air pollution chemistry and its model
CE703(C) INTEGRATED WASTE MANAGEMENT	
CO1	Analysis of physical, chemical and biological characteristics f solid waste
CO2	Application of principles of waste management
CO3	Application of concept of transfer station for material segregation
CO4	Processing and transformation of solid waste
CO5	Classification and design of landfills
CE704 PRESTRESSED CONCRETE STRUCTURE LAB	
CO1	Perform functional requirement analysis of respective problem domain.
CO2	Design er diagram and dfd of proposed project work.
CO3	Utilize modern techniques and tools necessary for project work.
CO4	Write their project work and conclusions.
CO5	Illustrate their project work through formal presentation.
CE705 IOT LAB	
CO1	Study and install ide of arduino and different types of arduino
CO2	Write program using arduino for blink led
CO3	Study the temperature sensor and write program for monitor temperature using arduino.
CO4	Study and implement rfid, nfc using arduino.
CO5	Study and implement different protocol using arduino.
CE706 MAJOR PROJECT I	
CO1	Develop skills and knowledge of students to solve technical problem
CO2	Identify and describe the problem and scope of project
CO3	Collect, analyse, present data into meaningful information using modern tools
CO4	Plan, select and execute methodology for solving technical problem
CO5	Present the results in written and oral format effectively
CE801 DESIGN OF STEEL STRUCTURE	
CO1	Analysis of various types of connections and use of limit state method for design
CO2	Design of compression and tension members
CO3	Design of flexural members
CO4	Design of column and column bases
CO5	Design of industrial buildings
CO6	Analysis of various types of connections and use of limit state method for design
CE 802(B) FOUNDATION ENGINEERING	
CO1	Selection of foundation and sub-soil exploration/investigation
CO2	Analysis and design of shallow foundation using various theories
CO3	Analysis and design of pile and pile group
CO4	Analysis of foundation on problematic soil & use of geo synthetics in geotechnical engineering
CO5	Analysis of earth pressure and their theories
CE803 (D) INTEGRATED WATER MANAGEMENT	
CO1	Application of water management with global and national perspectives
CO2	Plan and develop frame work for sustainable water resource management
CO3	Use of modern principles in water management and planning
CO4	Develop surface and sub-surface water systems along with water balance operation

CO5	Evaluate conventional and non-conventional techniques for water security
CE804 EARTHQUAKE RESISTANT STRUCTURE LAB	
CO1	Application of recommendations for making earthquake resistant structure
CO2	Application of base isolation techniques and dampers for earthquake resistant structure
CO3	Application of provisions of is codes for making earthquake resistant structure
CE805 MAJOR PROJECT II	
CO1	Undertake problem identification, formulation and solution
CO2	Demonstrate a sound technical knowledge of the selected topic
CO3	Develop communication skills through written and oral presentation
CO4	To investigate problem in depth and undertake literature survey in this regard
CO5	Design of engineering solution to the problem

PG COURSES

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING ENGINEERING

COURSE OUTCOMES(CO'S)

FIRST YEAR

MEPS-101 ADVANCED MATHEMATICS	
CO1	Remember the method to solve basic engineering models through partial differential equations such as wave equation, heat conduction equation etc.
CO2	Describe the problems of probability and able to solve them. Learn about binomial, Poison and normal distributions and their applications in different engineering and science fields etc
CO3	Execute the fundamental concepts of stochastic analysis and probability theory and its position in modern statistical and mathematical sciences and applied contexts.
CO4	Analyse the concepts of fuzzy sets and analysis of statistical data by using fuzzy logic methods. Able to use MATLAB for interactive computations.
CO5	Assess the concepts of reliability, various methods of reliability analysis and their applications.
MEPS-102 POWER SYSTEM DYNAMICS ANALYSIS AND CONTROL	
CO1	Remember the advanced knowledge about methods for dynamic power system analysis, including steady state and transient stability.
CO2	Describe the modelling of synchronous machines with excitation systems and hydro turbines including penstock and hydraulic system.
CO3	Execute specialized insight and understanding of power-frequency control and voltage control using detailed models of turbines, generators and network. Possess advanced knowledge of modelling and dynamic analysis of large power systems, in particular power system damping issues involving modal analysis.
CO4	Analyse the principle behaviour for primary control, including modelling of turbine governors and voltage controllers.
CO5	Assess the construction, modelling and control of FACTS components (SVC) related to power system stability.
MEPS-103 ADVANCE POWER SYSTEM PROTECTION RELAYS	
CO1	Remember current and voltage transformers and their impact on protection

	scheme performance. - Identify, apply, and calculate settings for over current, directional over current, distance, differential and pilot protection schemes.
CO2	Describe the various types of relays, comparators and their realization using static circuits.
CO3	Execute, apply, and calculate settings for power lines, transformer and generator and bus bar protection schemes.
CO4	Analyse different protection schemes for protection of transmission lines and bus bars.
CO5	Assess the new developments in Digital Protection. Realize the various dynamic characteristics of digital relays for protection of transmission lines and transformers.
MEPS-104 POWER ELECTRONICS APPLICATIONS TO POWER SYSTEMS	
CO1	Remember modelling of power system components.
CO2	Describe the concepts of sensitivity and contingency analysis
CO3	Execute the study voltage stability, various indicators and methods for improving voltage stability,
CO4	Analyse the significance of different types of FACTS controller and their modelling for power system control.
CO5	Assess the modern FACTS devices to improve steady and dynamic performance of power system.
MEPS-105 ADVANCE COURSE IN ELECTRICAL MACHINES	
CO1	Remember the advanced knowledge on electromechanical energy conversion and mathematical models of electrical machines including application and evaluation of steady state and dynamic performance of D.C. machines.
CO2	Describe modelling, steady state and dynamic performance of single and three phase induction machine.
CO3	Execute modelling of salient and non-salient synchronous generators.
CO4	Analyse and apply the concept of impedances, time constants and short circuit parameters of synchronous machines.
CO5	Assess the problems, issues and approximate methods for generator and system analysis.
MEPS-201 REACTIVE POWER CONTROL & FACTS	
CO1	Remember various types of controllers used in FACTS by knowing its application operation along with UPFC and IPFC.
CO2	Describe oscillation stability analysis of linearized model of electrical power system with various FACTS based stabilisers such Heffron-Phillips model of a SMIB system.
CO3	Execute the various behaviour of FACTS based stabiliser in SMIB system.
CO4	Analyse the damping torque contribution by FACTS based stabiliser installed in SMIB system by phase compensation method. Identify the installed location of FACTS based stabiliser.
CO5	Assess the transient stability control with FACTS devices using CSC, SSSC, SVC, STATCOM and UPFC control.
MEPS-202 ENERGY CONSERVATION AND MANAGEMENT	
CO1	Remember the various concepts related to energy conservation & audit such as policy, types, functions of energy managers, questionnaire, loss of energy, efficiency, optimization, instruments and material energy balance.
CO2	Describe the complete concept of Thermodynamics of energy conservation and efficient house keeping, heat recovery, thermal insulation, heat audit, ventilation

	and air conditioning, lubricants and preventive/preventive maintenance
CO3	Execute the concept of load side management including tariff, economic analysis, time value of money, pay back period.
CO4	Analyse the concepts of efficient electric drives, for transportation using electric vehicle and energy flow networks.
CO5	Assess the detail information of energy conservation in Sugar, textiles, Cement, process industry. Electrical energy conservation in building, heating, lighting and domestic gadgets.
MEPS-203 POWER QUALITY AND CONDITIONING	
CO1	Remember the concept of power quality and its causes and effects.
CO2	Describe the causes and effects of harmonics alons with converter configuration for its contribution.
CO3	Execute the concept to reduce the methods of harmonics in the line.
CO4	Analyse the different concept of methods to control the wave shape of currents and voltage.
CO5	Assess the contribution of electromagnetic interference.
MEPS-204 RESTRUCTURED POWER SYSTEMS	
CO1	Remember specialized insight and understanding of operation of deregulated electricity market systems.
CO2	Describe specialized insight about the issues in electricity markets and how these are handled world-wide in various markets (including India).
CO3	Execute the various types of electricity market operational and control issues under congestion management.
CO4	Analyse the operation of ancillary services.
CO5	Assess the different pricing mechanism and power trading in restructured power system.
MEPS-205 POWER SYSTEM TRANSIENT	
CO1	Remember the origin and nature and type of power system transients.
CO2	Describe the switching transients and damping of transients for short line fault studies.
CO3	Execute specialized insight and understanding about the travelling surges and lighting phenomena and fast transients in transmission lines.
CO4	Analyse surges and switching transients using simulation and other analytical tools and packages.
CO5	Assess the insulation coordination procedures for high voltages systems.
MPEPS-301 POWER SYSTEM-1	
CO1	Remember basic concept of instruments, various recording and display instruments.
CO2	Describe various transducers, sensors, actuators for pressure, temperature, velocity, speed, volume, torque, solar flux, current, and voltage and power factor.
CO3	Execute the concept of Gas analyser, pollution monitoring devices, instruments of power plant and industry.
CO4	Analyse the concept of signal conditioning of input, various channel data acquisition system. The examine the concept of signal converter, data logger and supervisory control.
CO5	Assess the detail content of data transmission system with time division multiplexing , pulse modulation and digital modulation.
MPEPS-302 POWER SYSTEM-1	

CO1	Remember the selection of electrical drive, concept of electrical drives dynamics and concept of operation of drives based on quadrant. List the component of load torques and selection of motor power rating.
CO2	Describe the concept of controlling of DC electrical motor using various content such as speed control method, controlled rectifier fed DC drive, close loop control of DC drive and its transient analysis.
CO3	Execute the concept of induction motor as a drive through its speed control, operation with unbalanced source, starting , breaking, transient behaviour and close loop control for single and three phase IM.
CO4	Analyse the various aspects of synchronous motor drive by taking up the concept of starting, breaking, operation and speed control on all types of synchronous motor.
CO5	Assess the important conceptual behaviour of electrical drives such as brushless dc motor, stepper motor, switched reluctance motor and solar/ battery powered drive.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE OUTCOMES(CO'S)

FIRST YEAR

MEDC-101 (Advanced Mathematics)	
CO1	Apply matrix theory in Communication Engineering problems
CO2	Calculate gradients, derivatives and its applications
CO3	Apply the constrained optimization for approximate solutions.
CO4	Do statistical modelling and analysis of Communication Systems
CO5	Apply Markovian process and distinguish the utility of queuing models
MEDC-102(Micro controller system Design)	
CO1	Compare general-purpose systems and embedded systems based on their characteristics
CO2	Describe the components, peripherals and communication interfaces of an embedded system
CO3	Illustrate the development and debugging process of an embedded system.
CO4	To understand architecture, features and need of ARM7& ARM CORTEX
CO5	To understand architecture, features and external interfaces of ARM 9 Microcontrollers
MEDC-103 DSP Application	
CO1	To build advanced concepts in digital signal processing applicable for processing and analyzing random process.
CO2	To enable the students to formulate and solve problems in Digital Systems design and implementation.
CO3	To design optimal filters using IIR and FIR filtering techniques
CO4	To familiarize with Signal Modeling and development of recursion techniques.
CO5	To acquaint the students with contemporary use and build DSP systems for real time problems
MEDC-104 (VLSI Design)	
CO1	To understand VLSI design methodologies
CO2	To give an insight to the students about the significance of CMOS

	technology and fabrication process
CO3	To introduce High speed VLSI techniques
CO4	To teach the importance and architectural features of programmable logic devices
CO5	To introduce the ASIC construction and design algorithms
MEDC-105(Data Communication and Computer network)	
CO1	Build an understanding of the fundamental concepts of computer networking, protocols, architectures, and applications
CO2	Gain expertise in design, implement and analyze performance perspective of TCP/IP layered Architecture
CO3	Identify and analyze the different types of network topologies, error and flow control mechanisms
CO4	Compare various congestion control mechanisms and identify suitable Transport layer protocol for real time applications
CO5	Illustrate the functionality of OSI and TCP/IP reference model
MEDC-106(LAB-I)	
CO1	Compare general-purpose systems and embedded systems based on their characteristics
CO2	Describe the components, peripherals and communication interfaces of an embedded system
CO3	Illustrate the development and debugging process of an embedded system.
CO4	To understand architecture, features and need of ARM7& ARM CORTEX
CO5	To understand architecture, features and external interfaces of ARM 9 Microcontrollers
MEDC-107(LAB-II)	
CO1	To understand VLSI design methodologies
CO2	To give an insight to the students about the significance of CMOS technology and fabrication process
CO3	To introduce High speed VLSI techniques
CO4	To teach the importance and architectural features of programmable logic devices
CO5	To introduce the ASIC construction and design algorithms
MEDC-201(System Programming)	
CO1	Define the basics Fundamental of programming, steps in problem solving with digital computer algorithm
CO2	Understand different data types and their operations
CO3	Analyze, compare and understand shorting and searching algorithm
CO4	Understand basic system programming like Assembler, interpreter etc
CO5	Explain the concept of pointer and its applications
MEDC-202(Modeling & Simulation of Computer)	
CO1	Define the basics of simulation modeling and replicating the practical situations in organizations
CO2	Generate random numbers and random variates using different techniques.
CO3	Develop simulation model using heuristic methods.
CO4	Analysis of Simulation models using input analyzer, and output analyzer
CO5	Explain Verification and Validation of simulation mode
MEDC-203(Network Design Technology)	
CO1	Comprehend and analyze OSI Security Architecture and Symmetric Key

	Encryption
CO2	Comprehend the various mathematic techniques in cryptography including number theory,Finite Field, modulo operator and Discrete Logarithm
CO3	Analyze block ciphers, Data Encryption Standard (DES), Advanced Encryption Standard (AES) and public key cryptography.
CO4	Understand the different types of network security protocols and its standards
CO5	Know the various network security mechanisms
MEDC-204(Optical Network)	
CO1	Apply the active, passive devices and optical amplifiers in optical networks.
CO2	Understand how nonlinear effects like SRS, SBS, SPM, XPM, FWM and Solitons can be used in optical fiber communications
CO3	Explain the difference between modulators like Electro optic and Acousto optic modulators used in optical transmitters
CO4	Determine Power and Rise time budgets and understand the different topologies of optical networks, WDM technology, CDMA and SCM
CO5	Design, analyse and evaluate fibre optical communication links
MEDC-205(Mobile & Satellite Communication)	
CO1	Design appropriate mobile communication systems.
CO2	Apply frequency-reuse concept in mobile communications, and to analyse its effects on interference, system capacity, handoff techniques
CO3	Distinguish various multiple-access techniques for mobile communications e.g. FDMA
CO4	Analyse path loss and interference for wireless telephony and their influences on a mobile communication system's performance.
CO5	Channel details, advantages and disadvantages of using the technology
MEDC-206(LAB-III)	
CO1	Define the basics Fundamental of programming, steps in problem solving with digital computer algorithm
CO2	Understand different data types and their operations
CO3	Analyse, compare and understand shorting and searching algorithem
CO4	Understand basic system programming like Assembler, interpreter etc
CO5	Explain the concept of pointer and its applications
MEDC-207(LAB-IV)	
CO1	Define the basics of simulation modeling and replicating the practical situations in organizations
CO2	Generate random numbers and random variates using different techniques.
CO3	Develop simulation model using heuristic methods.
CO4	Analysis of Simulation models using input analyzer, and output analyzer
CO5	Explain Verification and Validation of simulation mode
MEDC-301(Information Theory & Coding)	
CO1	Students will be able to Characterize and apply probabilistic techniques in modern digital communication systems, such as information systems, receivers, filtering and statistical operations
CO2	Comparatively evolve key results developed in this course for applications to signal processing, communications systems
CO3	Develop frameworks based in error coding and modulating techniques
CO4	Apply different channel coding techniques for error detection and correction

	schemes
CO5	Apply lossless source codes for discrete memory less source to improve the efficiency of information.
MEDC-302(Advanced Digital Communication)	
CO1	Design matched filter for detection of digital signals in the presence of white Gaussian noise
CO2	Design waveforms to overcome ISI in band-limited channels.
CO3	Design equalization circuits to overcome the effect of channel distortion
CO4	Compute probability of error for binary digital modulation schemes in the presence of AWGN
CO5	Use MATLAB and Simulink to experiment and experience the above digital modulation concepts
MEDC-303 (Seminar)	
CO1	Understand the concepts of Digital Communication.
CO2	Analyse the analytical model.
CO3	Apply the report writing skills
CO4	Develop communication skills and teamwork
CO5	Practice in utilizing quality information through various resources
MEDC-304 (Dissertation part I)	
CO1	Individual projects can be taken up
CO2	Involve in literature survey in the chosen field
CO3	Use Science/Engineering principles to solve identified issues
CO4	Adopt relevant and well-defined / innovative methodologies to fulfill the specified objective
CO5	Submission of scientific report in a specified format (after plagiarism check)
MEDC-401(Dissertation part II)	
CO1	Formulate specific problem statements for ill-defined real life problems with reasonable assumptions and constraints
CO2	Perform literature search and / or patent search in the area of interest
CO3	Conduct experiments / Design and Analysis / solution iterations and document the results.
CO4	Synthesize the results and arrive at scientific conclusions / products / solution
CO5	Document the results in the form of technical report / presentation

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

COURSE OUTCOMES(CO'S)

FIRST YEAR

MCSE-101 ADVANCED COMPUTATIONAL MATHEMATICS	
CO1	Introduce a scientific programming language and present its features.
CO2	Deal with the language commands such as computation, graphs, functions and loops.
CO3	Use a programming language to solve mathematical problems.
CO4	Build computational models to deal with scientific application
CO5	Write scientific researches using Latex or Scientific Workplace.
MCSE-102 ADVANCED DATA STRUCTURES AND ALGORITHM	

CO1	For a given search problem (linear search and binary search) student will be able to implement it
CO2	For a given problem of stacks, queues and link lists, students will be able to implement it and analyze the same to determine the time and computation complexity
CO3	Students will be able to write an algorithm for selection sort, insertion sort, quick sort, merge sort, heap sort, bubble sort and compare their performance
CO4	Students will be able to implement tree, graph search and traversal algorithms
CO5	Demonstrate various tree traversal methods.
MCSE-103 ADVANCED COMPUTOR ARCHITECTURE	
CO1	State principles of parallel computer design and compute system performance attributes.
CO2	Classify instruction set architectures and modern architectures such as RISC, Super Scalar, VLIW architecture.
CO3	Design collision free scheduling for pipeline processors.
CO4	Show Vector processing and vector instructions.
CO5	Demonstrate shared memory and distributed memory model.
MCSE-104 OBJECT ORIENTED TECHNOLOGY	
CO1	Implement encapsulation, abstraction of object oriented technology
CO2	Explain classes, their relationships and associativity of objects with classes.
CO3	Discuss various object oriented features like polymorphism, inheritance and abstract methods with example.
CO4	Perform operations with container classes and templates.
CO5	Perform the file operations with the help of various class libraries.
MCSE-105 ADVANCED COMPUTER NETWORKING	
CO1	Have a good understanding of the OSI Reference Model and its Layers
CO2	Identify core networking and infrastructure components and the roles they serve; and given requirements and constraints, design an IT infrastructure including devices, topologies, protocols, systems software, management and security;
CO3	Analyse the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
CO4	Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols
CO5	Discuss various security mechanisms in data transmission
MCSE 201 - Web Technology and Commerce	
CO1	Analyse web servers with their features and characteristics.
CO2	Apply web design issues for web publishing
CO3	Develop web elements using web technologies HTML and DHTML.
CO4	Use CSS and XML for static and dynamic web development.
CO5	Differentiate e-commerce models B2B, B2C and C2C.
MCSE- 202 Information theory, coding and cryptography	
CO1	Understanding of the basics of Cryptography and Network Security and working knowledge of Mathematics used in Cryptology.
CO2	Understanding of previous attacks on cryptosystems to prevent future attacks from securing
CO3	Knowledge about how to maintain the Confidentiality, Integrity and Availability
CO4	Understanding of various protocols for network security to protect
CO5	Getting hands-on experience of various Information Security Tools..

MCSE- 203 Advanced Concepts in Data Bases	
CO1	Explain various Data Models with their merits and demerits.
CO2	Construct SQL queries using various data manipulation statements.
CO3	Apply normalization up to 3NF on given relations.
CO4	Summarize concurrency control mechanism for database transactions
CO5	Utilize triggers and cursors in PL/SQL programming.
MCSE- 204 System Programming	
CO1	Implement installation process for Unix/Linux
CO2	Execute basic commands of Linux OS.
CO3	Analyse process states, process scheduling and scheduling priorities.
CO4	Implement file creation, file modification and file access permissions
CO5	Execute basic Shell Programming assignments
MCSE- 205 Soft Computing	
CO1	Compare artificial intelligence techniques A*, Best First Search, Hill climbing.
CO2	Discuss types of learning and back propagation mechanism.
CO3	Analyse standard neural networks ART, Boltzmann machine.
CO4	Compare fuzzy logic approach with traditional mathematical approach and demonstrate the fuzzy set application.
CO5	Discuss evolutionary based algorithms and genetic algorithm modules
MCSE 301 (A) – Data Warehousing & Mining	
CO1	Understand the functionality of the various data mining and data warehousing component
CO2	Appreciate the strengths and limitations of various data mining and data warehousing models
CO3	Explain the analyzing techniques of various data
CO4	Describe different methodologies used in data mining and data ware housing.
CO5	Compare different approaches of data ware housing and data mining with various technologies
MCSE 302 (A) – Network Security	
CO1	Analyse network security principles and services.
CO2	Analyse cryptography with its various techniques
CO3	Demonstrate digital signature with its component.
CO4	Demonstrate characteristics and working of viruses.
CO5	Analyse types and design principle for firewall.
CO6	Analyse security techniques for data and information
MCSE- 302 (B) Simulations and Modeling	
CO1	Develop mathematical models for engineering systems in different domains and derive analogies
CO2	Analyze first and second order linear and nonlinear systems in time and frequency domain
CO3	Perform system identification for linear time invariant systems
CO4	Simulate mathematical models of engineering systems using simulation software.

DEPARTMENT OF MASTER IN BUSINESS ADMINISTRATION

COURSE OUTCOMES(CO'S)

FIRST YEAR

CP-101 Management Concept and Practices	
CO1	Evaluate the global context for taking managerial actions of planning, organizing and controlling.
CO2	Analyse management principles into management practices.
CO3	Examine and access global Environment , including opportunities and threats and plaining that will impact management of an organization
CO4	Determine the most effective organisational design to take in specific situations.
CO5	Evaluate approaches to controlling issues of effective Management.
CP-102 Quantitative Methods	
CO1	Student will apply a professional knowledge of basic mathematical and statistical techniques needed for Research Problems.
CO2	Students will able to solve critical/complex business problem with the help quantitative Measures.
CO3	Students will able to Evaluate statistical tools and techniques and give corrective measures at the time of uncertainty.
CO4	Examine the direction and strength of a correlation between two or more factors.
CO5	Students will able to Design research questioner can be answered by quantitative measures
CP-103 Managerial Economics	
CO1	Student will be able to apply the concept of managerial economics and its application in decision making
CO2	Student will be able to analyze cost, profit maximization and sales maximization
CO3	Student will be able to examine the market structure under the prize distribution and price output decisions
CO4	Student will be able to judge the macroeconomics aggregates and concepts of GDP GNP for calculating national income
CO5	Student will be able to Execute important money supply and monetary policy fiscal policy measures
CP 104 Communication Skills	
CO1	Student will be able to analyse communication and its Barriers/Hurdles of Communication
CO2	Student will be able to design the their resume and present their strength and weakness in formal way.
CO3	Student will be able executing Concepts of Speaking Skills and listening skills Present and ready to develop himself for corporate world
CO4	Student will be able to connect its nonverbal communication and learn new skills for future growth.
CO5	Student will be able to design profession documentation in proper formats.
CP 105 International Business Environment	
CO1	Student will be able to examine the global business environment in terms of economic, social and cultural aspects.
CO2	Student will be able to execute the concepts in international business with respect to foreign trade/international business.
CO3	Student will be able to Analyse the exange rate and foreign investment for international business and strategies to be adopted by firms to expand globally.
CO4	Student will be able to Evaluate the concept in international business with functioning of global trade.
CO5	Student will be able to demonstrate concepts and facts of globalization with social responsibility and international business

CP 106 Accounting for Managers	
CO1	Student will be able to Execute financial accounting concepts its importance and scope with principles of double entry ledger, accounting and preparation of trial balance
CO2	Student will be able to solve the complex financial statement of company and the concept of depreciation accounting I will studied
CO3	Student will be able to Analyse the financial statement analysis under comparative statement, common size statement, ratio analysis and the basic concept of cash flow and fund flow analysis
CO4	Student will be able to Compare the Management Accounting in this concepts needs, importance and Basic concept of budget, budgetary control and zero based budgeting will under studied
CO5	Student will be able to evaluate the basis cost accounting in which records and process type of cost,cost sheet Basic concept of standard costing and variance analysis will understand
CP-201 Organisational Behaviour	
CO1	Students will be able to analyse various levels of studying organization behaviour
CO2	Students will be able to evaluate the factors influencing the individual behaviour in organization
CO3	Students will be able to infer the application of various motivational theories in organization
CO4	Student will be able to prepare appropriate conflicts resolution methods and negotiation techniques
CO5	Students will be able to interpret managerial problems and take effective decision
CP-202 Human Resource Management	
CO1	To help the students focus on and analyse the issues and strategies required to develop manpower planning.
CO2	Investigate and interpret the key procedures in recruitment and selection
CO3	To develop relevant skills necessary for socialisation Training and Development
CO4	To Enable the students to Evaluate the performance and appropriate wage determination in order to take correct business decisions
CO5	To execute appropriate dispute resolution technique in various industrial situation
CP-203 Financial Management	
CO1	Student will able to analyse financial analysis technique for achieving business objectives.
CO2	To select appropriate instruments of finance and analyse its effectiveness for organisation.
CO3	To weigh cost of different sources of raising capital and identify optimum capital structure.
CO4	To Compare various method of capital budgeting,
CO5	To investigate and evaluate working capital and dividend policy .
CP-204 Marketing Management	
CO1	Interpret complex marketing Environment and marketing concepts to solve marketing issues.
CO2	Apply marketing concept segmentation targeting and positioning in various

	markets.
CO3	Formulate strategies based on knowledge of 4 Ps for informed marketing decisions.
CO4	Analyse and apply various marketing channels and implementation of systems.
CO5	Evaluate and control marketing efforts in reference to contemporary marketing issues.
CP-205 Research Methodology	
CO1	Student will be able to use various objective of research methodology in industry.
CO2	Students will able to identify research problems and create hypothesis for research problems
CO3	Students will able to Select appropate sample design.
CO4	Examine various method of data collection for helpful in data processing and analysis.
CO5	Students will able to Design research report and apply statistical techniques for hypothesis testing.
CP-206 Project Management	
CO1	To develop strategy based on the project ideas
CO2	Analyse the Market demand, technical and financial feasibility.
CO3	To select appropriate techniques of financial analysis determining risk return and cost.
CO4	To evaluate various financing sources for project.
CO5	Execute and implement the effective control of project with the help of project review techniques.
CP-301 Business Policy and Strategic analysis	
CO1	Apply understanding for the concepts and tools that support strategic management in organizations.
CO2	Critically analyse the internal and external environments in which businesses operate and assess their significance for strategic planning.
CO3	Examine the nature and dynamics of strategic analysis formulation and implementation processes at corporate and business level.
CO4	Interoperate value chain and industrial analysis to design appropriate courses of action.
CO5	Evaluate and do the comparative analysis of industry.
CP-302 DIS AND MIS	
CO1	Apply sound managerial concepts and principles in the development and Management information systems
CO2	Examine systems analysis, design and SDLC.
CO3	Apply effective decision making skills through DSS to Improve business processes.
CO4	Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions
CO5	Design, implement and evaluate DSS /MIS solution to meet a given set of requirements.
FSM-01 Consumer Behaviour	
CO1	Sketch the relevance of consumer behaviour theories and concepts to marketing decisions
CO2	Analyse the information for processing decision rules and perception.

CO3	Relate to influence of personality and Attitude on Buying Behaviour
CO4	Judge various reference groups for consumer decision making
CO5	Evaluate industrial buying behaviour and its application
FSM-02 Advertising Management	
CO1	Analyse the relevant research in advertising and marketing communication
CO2	Apply DAGMAR approach in setting effective objective and target audience
CO3	Design effective advertising programme and media plan
CO4	Evaluate effective advertising communication for various advertising approaches.
CO5	Formulate creative strategies based on various levels of advertising.
FSO-01 Management of Industrial Relation	
CO1	To analyse perspective and issues in the area in order to effectively manage employee relations.
CO2	To Examine the trade union and its role in Industrial Relations
CO3	To develop insights into effective use and application of the Grievance redressals for employee relations management
CO4	To interpret and implement the productive bargaining techniques and gain sharing in the organization.
CO5	To Analyse Industrial Relation with respect to technological change
FSO-02 Management of Training and Development	
CO1	Student will be able to use the concept of training process to solve contemporary training challenges.
CO2	Student will be able to evaluate training needs for practical problem in organisation.
CO3	Student will be able to develop appropriate instructional objective and lesion plan based on the pedagogy.
CO4	Student will be able to design training modules using effective training methods and techniques.
CO5	Student will be able to test the effectiveness of training using different evaluation methods
FSF-01 Security Analysis and investment management	
CO1	Interpret basic concepts of investments and the nuances of securities and Indian stock market.
CO2	Illustrate knowledge of investing in market indices and assuming returns.
CO3	Examine valuation theories for utilizing knowledge gained for optimum investment decisions
CO4	Analyse and apply models to securities performance and forecasting
CO5	Evaluate stock market in Indian context with the help of market theories and approaches
FSF-02 Working Capital Management	
CO1	Evaluate the types of working capital available to a company and its determinants.
CO2	Evaluate a company's management of accounts receivable, inventory, and accounts payable over time and compared to peer companies.
CO3	Explain the effect of different types of cash flows on a company's net daily cash position.
CO4	Interoperate the need of inventory management in codification and valuation of inventories.

CO5	Measure working capital effectiveness of a company based on its operating and cash conversion cycles, and compare the company's effectiveness with that of peer companies.
FSB-01 Management of Banking and Insurance Institutions	
CO1	Apply knowledge of banking operations and regularity frame work in the analysis of financial institutions.
CO2	Evaluate Asset Liability Management (ALM) for measuring, monitoring and managing the market risk of a bank.
CO3	Analyse the Role of banking institutions and Intermediaries.
CO4	Interpret types of insurance and concept of Regulatory Framework of Insurance Sector.
CO5	Compare various insurance and working principles of financial instruments
FSB-02 Financial Planning and Wealth Management	
CO1	Use finance concepts and process for financial planning
CO2	Analyse the risk for various insurance products and its management
CO3	Compare various benefits and regulations for retirement planning
CO4	Evaluate investment planning instrument in view of wealth management
CO5	Apply knowledge of tax compliances and structure in India for effective tax planning.
CP-402 Business Legislation	
CO1	Utilised the knowledge of company laws incorporate different type of companies.
CO2	Identified laws related to contract for performance and breach and remedies.
CO3	Achieve knowledge regarding consumer protection laws to save guard consumers right.
CO4	Demonstrate skills to deal with pollution environment and IPR issues of company
CO5	Develop approach to lead mergers and acquisition in view of MNC'S in India.
FSM-03 Sales and distribution management	
CO1	To be able to set and formulate Personal Selling objectives
CO2	To be able to develop sales training programme for sales personnel
CO3	To be able to design territories and allocate sales quota to sales personnel
CO4	To be able to categorize various marketing channels and identify appropriateness for distribution
CO5	To be able to assess the performance of marketing channels
FSM -04 Service Marketing	
CO1	Apply the concept of service marketing mix to develop effective marketing strategies for services.
CO2	Devise strategy for influencing for customer perception for services
CO3	Creating suitable pricing strategy for service products.
CO4	Reviewing the role of people physical evidence and process in developing service marketing strategy.
CO5	Measuring the customer satisfaction level and resolving complaints using various models.
FSO-03 Human Resource Planning and Development	
CO1	To analyse the strategic issues and strategies require to select and develop man power resources.
CO2	To develop necessary skills and techniques of manpower demand and supply.

CO3	Ability to implement the practice related to employee retention, redeployment and exit strategies.
CO4	To evaluate the performance and potential appraisal technique in industries
CO5	To design the HRD Strategies and evaluate the human resource accounting system.
FSO-04 Compensation Management	
CO1	Student can able to analyse the philosophies and issues of compensation management
CO2	Student can able to evaluate the different fringe benefits and develop the basic pay system.
CO3	Student can able to inference the theories of wages and wage structure.
CO4	Student can able to estimate the issues related to law based performance pay system in compensation.
CO5	Student can able to design the compensation strategy and examine the wage board.
FSF-03 Management of Financial Services	
CO1	Apply the concept financial system and market to organisation problem
CO2	Analysed and evaluate risk in financial services and mutual funds.
CO3	Estimate the issue of share bounds and fixed deposit, corporate loans.
CO4	Compare and choose from various financial services.
CO5	Discuss the concept and issues related to banking and insurance.
FSF-04 Strategic Corporate Finance	
CO1	To enable the student to identify the key themes in corporate finance
CO2	Determine the overall strategy of the firm and factor affecting company financial strategy.
CO3	Build the concept of corporate tax and GST.
CO4	Student can able to measure and solve the issue related to bouns,inter corporate investment and innovative financial products.
CO5	Student can able to evaluate strategic alliance, advantage disadvantage and steps to forming a joint venture.
FSB-03 Financial Institution and Markets	
CO1	Student can able to demostrate the indian financial markets n with special reference to SEBI,NBF'C and Indian Mutual Funds.
CO2	Student can able to evaluate the concept of money ,foreign exchange,pension,Securities,mortgage and derivetives markets
CO3	Determine the theories related to interest rates.
CO4	Examine the risk management in financial institution and managing risk with balance sheet.
CO5	Compare indian and international eurocurrency markets.
FSB-04 Financial Risk Management	
CO1	Student can able to use different techniques and methods of financial risk management in real life situation.
CO2	Analyse the mechanism of future markets.
CO3	Evaluate the models related to trading and stock indices.
CO4	Student can able to evaluate the swaps including interest rate, commodity, currency and pricing.
CO5	Student can able to apply the concept related to market derivatives.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRAM SPECIFIC OBJECTIVES (PSOs)

A graduate of Computer Science and Engineering Program will develop

1. An ability to demonstrate basic knowledge of Data structure, Database Management System, Software Engineering, Computer Networking and Operating System.

2. An ability to design & develop software projects using computer science principles and open source software tools.

3. An ability to apply acquired knowledge of theoretical and modern computer science subjects in problem solving of domains such as web and mobile based application development, database management system and network security.

4. An ability to employ assimilated learning and knowledge from curricular courses towards personality development and grooming as responsible citizens.

First year

COURSE OUTCOMES for BT-101 Engineering Chemistry

Students should be able to

BT101.1	Solve analytical problem of hard water
BT101.2	Use lubricants in relevant fields
BT101.3	Apply polymer science in daily life
BT101.4	Analyse phases of heterogenous systems
BT101.5	Interpret atomic and molecular structure of substances

CO-PO: Mapping for BT-101 Engineering Chemistry

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
BT101.1	3	3	3	3	-	1	-	1	2	1	-	3
BT101.2	3	3	3	3	-	1	-	-	2	1	-	3
BT101.3	3	2	3	3	-	1	-	-	1	1	1	3

BT101.4	3	3	3	3	-	1	-	1	2	1	-	3
BT101.5	3	3	3	3	1	1	-	-	2	1	1	3
	3	**3**	**3**	**3**	**1**	**1**	**-**	**1**	**2**	**1**	**1**	**3**

COURSE OUTCOMES for BT-102 Engineering Mathematics-I
Students should be able to

CBT102.1	Introduce the fallout of the Rolle's theorem that is fundamental to application of analysis to Engineering problem.
CBT102.2	To introduce the idea of applying differential and integral calculus of curvature and to improve integral apart from some application it gives a basic introduction on Beta and Gamma function.
CBT102.3	To develop the tool of power series and Fourier series for learning advance Engineering Mathematics.
CBT102.4	To familiarize the student with linear algebra that is essential in most branches of engineering.
CBT102.5	To create the essential tool of matrices in a comprehensive manners.

CO-PO: Mapping for BT-102 Engineering Mathematics-I

PO CO	**PO1**	**PO2**	**PO3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO 9**	**PO10**	**PO1 1**	**PO12**
CBT102.1	3	3	1	2	1	2	1	1	1	2	0	3
CBT102.2	3	3	2	2	2	3	1	2	1	2	0	3
CBT102.3	3	3	2	2	1	2	1	1	1	2	0	3
CBT102.4	3	3	2	2	2	2	1	2	1	3	0	3
CBT102.5	3	3	1	1	2	2	1	1	1	3	0	3

COURSE OUTCOMES for BT-103 English for Communication

Students should be able to

103.1	Able to understand the role of effective communication for success in professional world and develop effective communication to be employable.
103.2	Able to read actively and write and speak with grammatical correctness.
103.3	Enhance all four basic skills of language learning specially listening and understanding any kind of spoken material adored with different accent, voice modulation, tone variation and stress pattern.
103.4	Inculcate the art of effective presentation with proper body language and voice modulation.
103.5	Hone writing business correspondence like business letters and reports properly.

CO-PO: Mapping for BT-103 English for Communication

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
BT103.1	3	3	3	3	-	1	-	1	2	1	-	3
BT103.2	3	3	3	3	-	1	-	-	2	1	-	3
BT103.3	3	2	3	3	-	1	-	-	1	1	1	3
BT103.4	3	3	3	3	-	1	-	1	2	1	-	3
BT103.5	3	3	3	3	1	1	-	-	2	1	1	3
	3	**3**	**3**	**3**	**1**	**1**	**-**	**1**	**2**	**1**	**1**	**3**

COURSE OUTCOMES for BT-105 Engineering Graphics

Students should be able to

C105.1	Ability to develop an understanding of construction of different types of scales and curves, their use in preparation of drawing of different elements.
C105.2	Knowledge of projections, types of projection and projections of straight lines. Familiarize with the projections of 1D, 2D& 3D elements.
C105.3	Ability to identify and construction of projections of planes and solids and their use in preparation and interpretation of building and machine drawings.
C105.4	Familiarize with the sectioning of solids and developments of surfaces of different solids. Knowledge of sheet metal fabrication of different mechanical component.
C105.5	Ability to construction of isometric projection of different solids, castings etc. knowledge of computer aided drawing and with the help of AUTOCAD software construction of machine component drawings.

CO-PO: Mapping for BT-105 Engineering Graphics

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
BT103.1	3	3	3	3	-	1	-	1	2	1	-	3
BT103.2	3	3	3	3	-	1	-	-	2	1	-	3
BT103.3	3	2	3	3	-	1	-	-	1	1	1	3
BT103.4	3	3	3	3	-	1	-	1	2	1	-	3
BT103.5	3	3	3	3	1	1	-	-	2	1	1	3
	3	**3**	**3**	**3**	**1**	**1**	**-**	**1**	**2**	**1**	**1**	**3**

COURSE OUTCOMES for BT-201 Engineering Physics

Students should be able to

BT201.1	Apply physical significance of Gradient, Divergence and Curl on various surfaces in engineering physics
BT201.2	Determine various parameters related to Laser, Fibre optics and optics
BT201.3	Find position and momentum of free particle by Schrödinger wave equation
BT201.4	Use characteristics of diodes and binding energy of nucleus in instrumentations
BT201.5	Apply behavior of electric and magnetic field on a nuclear particle in engineering

CO-PO: Mapping for BT-201 Engineering Physics

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
BT201.1	3	3	3	3	-	1	-	1	2	1	-	3
BT201.2	3	3	3	3	-	1	-	-	2	1	-	3
BT201.3	3	2	3	3	-	1	-	-	1	1	1	3
BT201.4	3	3	3	3	-	1	-	1	2	1	-	3
BT201.5	3	3	3	3	1	1	-	-	2	1	1	3
	3	**3**	**3**	**3**	**1**	**1**	**-**	**1**	**2**	**1**	**1**	**3**

COURSE OUTCOMES for BT-202 Engineering Mathematics-II

Students should be able to

BT202.1	Introduce effective mathematical tools for the solution of ODE.
BT202.2	Use of Analytical method to second order differential equation in Engineering
BT202.3	Formulate the partial differential equations to solve engineering problem
BT202.4	Apply tools of differentiation and integration of function of complex variable that are used in various techniques dealing engineering problem.
BT202.5	Understand physical significance of Gradient, Divergence and Curl in complex engineering problems.

CO-PO: Mapping for BT-202 Engineering Mathematics-II

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
BT202.1	3	3	3	3	-	1	-	1	2	1	-	3
BT202.2	3	3	3	3	-	1	-	-	2	1	-	3
BT202.3	3	2	3	3	-	1	-	-	1	1	1	3
BT202.4	3	3	3	3	-	1	-	1	2	1	-	3
BT202.5	3	3	3	3	1	1	-	-	2	1	1	3
	3	**3**	**3**	**3**	**1**	**1**	**-**	**1**	**2**	**1**	**1**	**3**

COURSE OUTCOMES for BT-203 Basic Mechanical Engineering

Students should be able to

C203.1	An ability to analyze basic properties of material its applications in industry, design and conduct experiments, as well as to analyze and interpret data.
C203.2	Student will be able to describe the basic concept of metro logy,its working and application knowledge on industrial machines.
C203.3	An ability to formulate, analyze properties of fluids, hydraulic machines to solve engineering problem.
C203.4	Student will be able to apply concept of thermodynamics in modern engineering.
C203.5	An ability to understand,design and evaluate the basic concept of I.C.Engine its components.

CO-PO: Mapping for BT-203 Basic Mechanical Engineering

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C203.1	3	3	3	3	-	1	-	1	2	1	-	3
C203.2	3	3	3	3	-	1	-	-	2	1	-	3
C203.3	3	2	3	3	-	1	-	-	1	1	1	3
C203.4	3	3	3	3	-	1	-	1	2	1	-	3
C203.5	3	3	3	3	1	1	-	-	2	1	1	3
	3	**3**	**3**	**3**	**1**	**1**	**-**	**1**	**2**	**1**	**1**	**3**

COURSE OUTCOMES for BT-204 Basic Civil Engineering and Engineering Mechanics

Students should be able to

204.1	Student should get general idea of selection of building materials for the components of building construction as per requirement of site.
204.2	Students should be able to get the concepts of surveying methods, results and surveying instruments in field.
204.3	Students should be able to do plotting of area traversed in field survey using conventional and modern techniques.
204.4	Students should be able to understand the use of principle of static and dynamics in civil engineering structures.
204.5	Students should be able to use centre of gravity and moment of inertia for finding complex cross sections.

CO-PO: Mapping for BT-204 Basic Civil Engineering and Engineering Mechanics

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C203.1	3	3	3	3	-	1	-	1	2	1	-	3
C203.2	3	3	3	3	-	1	-	-	2	1	-	3
C203.3	3	2	3	3	-	1	-	-	1	1	1	3
C203.4	3	3	3	3	-	1	-	1	2	1	-	3
C203.5	3	3	3	3	1	1	-	-	2	1	1	3
	3	**3**	**3**	**3**	**1**	**1**	**-**	**1**	**2**	**1**	**1**	**3**

COURSE OUTCOMES for BT-205 Basic Computer Engineering

Students should be able to

CO205.1	Student should be able to understand the architecture of a computer with its various processing units. In addition to this student can understand memory management system of computer and also application of computer in real world.
CO205.2	Students should be able to understand basic knowledge of programming language, and acquire knowledge about the basic concept of how to write a program in C++.
CO205.3	Students should be able to understand various Object Oriented features like polymorphism, inheritance, object, classes and also able to learn about various data structures.
CO205.4	Students should be able to understand fundamental underlying principles of computer networking, network security threats, security measures and ethical issues related to the misuse of computer security.
CO205.5	Student should be able to learn about DBMS concept, different Data Base languages, DBA and key concepts of Cloud Computing.

CO-PO: Mapping for BT-205 Basic Computer Engineering

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO205.1	3	3	3	3	-	1	-	1	2	1	-	3
CO205.2	3	3	3	3	-	1	-	-	2	1	-	3
CO205.3	3	2	3	3	-	1	-	-	1	1	1	3
CO205.4	3	3	3	3	-	1	-	1	2	1	-	3
CO205.5	3	3	3	3	1	1	-	-	2	1	1	3
	3	**3**	**3**	**3**	**1**	**1**	**-**	**1**	**2**	**1**	**1**	**3**

Second Year

COURSE OUTCOMES for BT-301 ENGINEERING MATHEMATICS-III

Students should be able to

C301.1	To introduce effective mathematical tools for the Numerical Solution of algebraic
C301.2	Understand numerical differentiation and integration and use numerical techniques
C301.3	Work numerically on ODE and PDE using different method through the theory of
C301.4	Discuss Laplace transform, Inverse Laplace transform and Fourier Transform which
C301.5	To acquaint the student with mathematical tools available in Statistics& Probability

CO-PO: Mapping for BT-301 ENGINEERING MATHEMATICS-III

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO302.1	3	3	2	3	1	2	1	1	1	1	0	1
CO302.2	3	3	2	3	1	2	1	1	1	1	0	1
CO302.3	3	3	3	3	1	2	1	1	1	1	0	1
CO302.4	3	3	2	3	1	1	1	1	1	1	0	1
CO302.5	3	3	3	3	1	3	1	1	1	1	0	3
	3	**2**	**2**	**3**	**1**	**2**	**1**	**-**	**1**	**-**	**-**	**2**

CO-PSO Mapping for BE-301 Engineering Mathematics-II

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C301.1	-	-	2	2
C301.2	-	-	2	2
C301.3	-	-	2	2
C301.4	-	1	2	2
C301.5	-	-	2	2
C301.6	-	-	2	2
	0	**1**	**2**	**2**

COURSE OUTCOMES for CS-302 Discrete Structures

Students should be able to

CO302.1	Apply the key concepts of Set Theory and also gain knowledge to computer logics.
CO302.2	Construct various Algebraic Structures.
CO302.3	Analyse method of representing mathematical propositional logic and its
CO302.4	Discuss graph theory concepts to solve complex problems.
CO302.5	Describe Possets, Hasse Diagram and Lattices with suitable example.

CO-PO: Mapping for CS-302 Discrete Structures

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO302.1	3	2	1	1	-	2	1	-	1	-	-	2
CO302.2	3	2	1	1	-	2	1	-	1	-	-	2
CO302.3	3	2	1	3	-	2	1	-	1	-	-	2
CO302.4	3	2	1	3	1	2	1	-	1	-	-	2
CO302.5	3	2	1	3	1	2	1	-	1	-	-	2
	3	**2**	**2**	**3**	**1**	**2**	**1**	**-**	**1**	**-**	**-**	**2**

CO-PSO Mapping for CS-302 Discrete Structures

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO302.1	-	1	-	-
CO302.2	-	1	-	-
CO302.3	-	1	-	2
CO302.4	-	1	1	2
CO302.5	-	1	1	2
CO302.6	-	1	-	2
	0	**1**	**1**	**2**

COURSE OUTCOMES for CS-303 Data structure

Students should be able to

CO303.1	Explain stack and queue data structures along with their merits and demerits
CO303.2	Use primitive operations on arrays, structures, stack and queue data structures.
CO303.3	Develop programs to perform primitive operations on linked lists.
CO303.4	Utilize Dijkstra's algorithm to find spanning tree for a given graph.
CO303.5	Apply quick and merge sorting methods in problem solving.

CO-PO: Mapping for CS-303 Data structure

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO303.1	3	3	1	-	-	-	-	-	2	-	2	3
CO303.2	3	-	3	-	-	2	-	-	2	-	-	3
CO303.3	3	1	3	2	-	-	-	1	2	-	-	3
CO303.4	3	1	1	2	-	1	-	-	2	2	2	3
CO303.5	3	2	1	-	2	-	-	-	2	2	-	3
	3	**2**	**2**	**2**	**2**	**2**	**-**	**1**	**2**	**2**	**2**	**3**

CO-PSO Mapping for CS-305 Data structure and Algorithm

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO305.1	3	2	3	-
CO305.2	3	2	3	-
CO305.3	3	2	2	-
CO305.4	3	2	3	3
CO305.5	3	2	3	3
CO305.6	3	2	2	-
	3	**2**	**3**	**3**

COURSE OUTCOMES for CS 304 Digital Systems

Students should be able to

CO304.1	Design and implement digital circuits of desired specifications.
CO304.2	Anlyse digital circuits for fault detection and correction.
CO304.3	Configure cost effective digital circuits used in memory system and control
CO304.4	Understand the difference between analog and digital circuits.
CO304.5	Know various digital ICs available and their relative merits and demerits.

CO-PO: Mapping for CS 304 Digital Systems

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO304.1	3	3	3	3	3	2	2	2	2	1	-	3
CO304.2	3	3	3	3	3	2	2	2	2	1	-	3
CO304.3	3	3	3	3	3	2	2	2	22	1	-	3
CO304.4	3	3	3	3	3	2	2	2	2	1	-	3
CO304.5	3	3	3	3	3	2	2	2	2	1	-	3
	3	**3**	**3**	**3**	**3**	**2**	**2**	**2**	**2**	**1**	**0**	**3**

CO-PSO Mapping for CS 304 Digital Systems

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO304.1	-	-	1	2
CO304.2	-	-	1	2
CO304.3	-	-	1	-
CO304.4	-	-	-	2
CO304.5	-	-	-	-
CO304.6	-	-	1	2
	0	**0**	**1**	**2**

COURSE OUTCOMES for CS-305 Object Oriented Programming Methodology

Students should be able to

CO305.1	Implement encapsulation, abstraction of object oriented technology
CO305.2	Explain classes, their relationships and associativity of objects with classes.
CO305.3	Discuss various object oriented features like polymorphism, inheritance and abstract methods with example.
CO305.4	Perform operations with container classes and templates.
CO305.5	Perform the file operations with the help of various class library.

CO-PO: Mapping for CS-305 Object Oriented Programming Methodology

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO305.1	3	3	3	2	1	2	2	-	2	1	2	3
CO305.2	3	3	3	1	2	2	2	-	2	1	2	3
CO305.3	3	3	3	2	1	2	2	-	2	1	2	3
CO305.4	3	3	3	2	2	2	2	-	2	1	1	3
CO305.5	3	3	3	1	1	2	2	-	2	1	1	3
	3	**3**	**3**	**2**	**1**	**2**	**2**	**-**	**2**	**1.5**	**2**	**3**

CO-PSO Mapping for CS-305 Object Oriented Programming Methodology

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO305.1	1	3	2	2
CO305.2	1	3	2	2
CO305.3	1	3	2	2
CO305.4	1	3	2	2
CO305.5	1	3	2	2
CO305.6	1	3	2	2
	1	**3**	**2**	**2**

COURSE OUTCOMES for CS-306 Computer Workshop (Java)

Students should be able to

CO306.1	Explain basic architecture of JAVA and capabilities of Java Language.
CO306.2	Illustrate basic concepts of object oriented programming and apply these concepts with the help of Java Language.
CO306.3	Update and retrieve the data from the database using JDBC connectivity.
CO306.4	Develop the graphical user interaction programs.
CO306.5	Demonstrate development of web based applications with the help of servlets and

CO-PO: Mapping for CS-306 Computer Workshop (Java)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO306.1	3	3	3	2	2	2	-	-	2	1	1	3
CO306.2	3	3	3	2	2	2	-	-	2	1	1	3
CO306.3		3	3	2	3	2	-	-	3	1	1	3
CO306.4	3	2	3	3	3	2	-	1	3	1	2	3
CO306.5	2	2	3	3	3	2	-	1	3	1	2	3
	3	**3**	**3**	**3**	**2**	**2**	**-**	**1**	**2**	**2**	**1**	**3**

CO-PSO Mapping for CS-306 Computer Workshop (Java)

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO306.1	-	2	3	3
CO306.2	-	2	3	3
CO306.3	-	2	3	3
CO306.4	-	2	3	3
CO306.5	-	-	3	3
CO306.6	-	-	3	3
	0	**2**	**3**	**3**

COURSE OUTCOMES for BT-401 Engineering Mathematics-III

Students should be able to

CO401.1	Evaluation of complex integrals in engineering applications.
CO401.2	Use numerical methods to determine approximate solution in engineering.
CO401.3	Use interpolation technique to find functional values in engineering.
CO401.4	Solve given differential equations by methods of iteration.
CO401.5	Find correlation and probability frequency distribution of samples collected from

CO-PO: Mapping for BT-401 Engineering Mathematics-III

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO401.1	3	3	2	3	-	1	-	-	2	1	-	2
CO401.2	3	3	2	3	-	1	-	1	2	1	-	3
CO401.3	3	3	3	3	-	1	-	-	2	1	1	3
CO401.4	3	3	3	3	-	1	-	-	2	1	-	3
CO401.5	3	3	3	3	1	1	1	1	2	1	-	3
	3	**3**	**3**	**3**	**1**	**1**	**1**	**1**	**2**	**1**	**1**	**3**

CO-PSO Mapping for BT-401 Engineering Mathematics-III

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO401.1	**-**	**1**	**2**	**2**
CO401.2	**-**	**-**	**2**	**2**
CO401.3	**-**	**-**	**2**	**2**
CO401.4	**-**	**-**	**2**	**2**
CO401.5	**-**	**-**	**2**	**2**
CO401.6	**-**	**1**	**2**	**2**
	0	**1**	**2**	**2**

COURSE OUTCOMES for CS-402 Analysis Design & Algorithms

Students should be able to

CO402.1	Evaluate space and time complexity of merge sort algorithms.
CO402.2	Use greedy strategy to find minimum spanning tree using Prim's algorithm.
CO402.3	Apply backtracking techniques for solving eight-queen problem.
CO402.4	Implement branch and bound methods to solve traveling salesman problem.
CO402.5	Solve knapsack problem using dynamic programming algorithm.

CO-PO: Mapping for CS-402 Analysis Design & Algorithms

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO404.1	3	3	3	1	-	-	-	-	1	-	2	2
CO404.2	3	3	3	3	2	-	-	-	1	-	2	2
CO404.3	3	3	3	3	2	-	3	-	1	-	2	2
CO404.4	3	3	3	2	-	-	-	-	1	1	2	2
CO404.5	3	3	3	2	2	-	3	-	1	1	2	2
	3	**3**	**3**	**2**	**2**	**-**	**3**	**-**	**1**	**1**	**2**	**2**

CO-PSO Mapping for CS-402 Analysis Design & Algorithms

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO404.1	1	-	2	-
CO404.2	1	-	2	-
CO404.3	1	-	2	-
CO404.4	1	2	2	2
CO404.5	1	2	2	2
CO404.6	1	-	2	-
	1	**2**	**2**	**2**

COURSE OUTCOMES for CS-403 Software Engineering

Students should be able to

CO 403.1	Compare software development models with their merits and demerits.
CO 403.2	Construct Software Requirement Specification with functional and non-functional requirements.
CO 403.3	Apply boundary value analysis and equivalence partitioning testing techniques.
CO 403.4	Calculate Cyclomatic complexity for given program.
CO 403.5	Apply COCOMO model for estimating cost and efforts.

CO-PO: Mapping for CS-403 Software Engineering

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 403.1	3	3	-	2	3	-	1	2	3	1	3	3
CO 403.2	3	3	3	3	2	-	1	2	3	2	3	3
CO 403.3	3	3	3	3	2	-	-	-	2	1	3	3
CO 403.4	3	-	-	3	3	-	-	-	2	2	3	3
CO 403.5	3	-	2	3	3	-	-	-	3	1	3	3
	3	**3**	**2**	**3**	**3**	**-**	**1**	**2**	**3**	**2**	**3**	**3**

CO-PSO Mapping for CS-403 Software Engineering

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO 403.1	3	-	2	-
CO 403.2	3	3	2	3
CO 403.3	3	3	2	3
CO 403.4	3	-	2	-
CO 403.5	3	-	3	-
CO 403.6	3	3	3	3
	3	**3**	**2**	**3**

COURSE OUTCOMES for CS-404 Computer Organization and Architecture

Students should be able to

CO404.1	Analyze instruction execution cycle and addressing modes for computer processor.
CO404.2	Analyze computer arithmetic and types of micro-processor.
CO404.3	Describe I/O subsystems
CO404.4	Explain Memory architecture with diagram
CO404.5	Interpret the use of parallel processing in uniprocessor system & multiprocessor architecture.

CO-PO: Mapping for CS-404 Computer Organization and Architecture

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO404.1	3	2	-	-	-	-	2	-	1	1	-	3
CO404.2	3	2	-	-	-	-	2	-	1	1	-	3
CO404.3		2	-	-	-	-	2	-	1	1	-	3
CO404.4	3	2	-	-	-	-	2	-	1	1	-	3
CO404.5	3	2	2	3	-	-	2	1	1	1	-	3
	3	**2**	**2**	**1**	**-**	**-**	**2**	**1**	**1**	**1**	**-**	**3**

CO-PSO Mapping for CS-404 Computer Organization and Architecture

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO404.1	-	1	2	-
CO404.2	-	2	2	-
CO404.3	-	2	2	-
CO404.4	-	1	2	-
CO404.5	-	1	2	2
CO404.6	-	2	-	-
	0	**1.5**	**2**	2

COURSE OUTCOMES for CS-405 Operating System

Students should be able to

CO405.1	Compare various types of operating systems
CO405.2	Analyse FCFS, SSTF, SCAN and LOOK disk scheduling algorithm techniques
CO405.3	Implement FCFS, SJF, PRIORITY, RR CPU scheduling algorithm.
CO405.4	Summarize various memory management techniques.
CO405.5	Differentiate between Remote Procedure Call and Remote method invocation.

CO-PO: Mapping for CS-405 Operating System

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO405.1	3	3	-	-	-	2	3	-	1	1	1	3
CO405.2	3	3	3	1	-	-	-	-	1	1	1	3
CO405.3	3	3	3	1	-	-	-	-	1	1	1	3
CO405.4	3	3	-	-	2	-	2	-	1	1	1	3
CO405.5	3	3	-	-	2	2	2	-	1	1	1	3
	3	**3**	**2**	**1**	**2**	**2**	**2**	**1**	**2**	**1**	**1**	**3**

CO-PSO Mapping for CS-405 Operating System

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO405.1	3	1	1	-
CO405.2	3	1	1	-
CO405.3	3	1	1	-
CO405.4	3	1	1	-
CO405.5	3	1	2	-
CO405.6	3	1	2	-
	3	**1**	**1**	**0**

COURSE OUTCOMES for CS-406 Programming Practices (Python)

Students should be able to

CO406.1	Analyse basic features of python and compare it with other programming language.
CO406.2	Implement primitive and derived data structures with python.
CO406.3	Implement structural and functional programming concept with python.
CO406.4	Implement object oriented programming concept with python.
CO406.5	Illustrate concurrent programming with python.

CO-PO: Mapping for CS-406 Programming Practices (Python)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO406.1	3	3	-	-	-	2	3	-	1	1	1	3
CO406.2	3	3	3	1	-	-	-	-	1	1	1	3
CO406.3	3	3	3	1	-	-	-	-	1	1	1	3
CO406.4	3	3	-	-	2	-	2	-	1	1	1	3
CO406.5	3	3	-	-	2	2	2	-	1	1	1	3
	3	**3**	**2**	**1**	**2**	**2**	**2**	**1**	**2**	**1**	**1**	**3**

CO-PSO Mapping for CS-406 Programming Practices (Python)

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO406.1	-	2	3	3
CO406.2	-	2	3	3
CO406.3	-	2	3	3
CO406.4	-	2	3	3
CO406.5	-	-	3	3
CO406.6	-	-	3	3
	0	**2**	**3**	**3**

Third Year

COURSE OUTCOMES for CS-501 Theory of Computation

Students should be able to

CO501.1	Compare deterministic and nondeterministic finite state machines.
CO501.2	Sketch Finite State Machine and push down automata on various types of languages
CO501.3	Classify various types of languages based on recognizer and generator
CO501.4	Explain recursive and recursively enumerable languages
CO501.5	Illustrate Turing machine as a capacitor with its capabilities

CO-PO: Mapping for CS-501 Theory of Computation

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO501.1	3	2	3	2	-	-	-	-	2	1	1	2
CO501.2	3	3	3	3	-	-	-	-	2	1	1	2
CO501.3	3	3	3	3	1	-	-	-	2	1	1	2
CO501.4	3	3	2	3	1	-	-	-	2	1	1	2
CO501.5	3	3	2	3	1	-	-	-	2	1	1	2
	3	**3**	**2**	**2**	**1**	**-**	**-**	**-**	**2**	**1**	**1**	**2**

CO-PSO Mapping for CS-501 Theory of Computation

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO501.1	2	-	2	-
CO501.2	2	-	2	-
CO501.3	2	-	2	2
CO501.4	2	-	2	2
CO501.5	2	-	2	2
CO501.6	2	-	2	2
	2	**-**	**2**	**2**

COURSE OUTCOMES for CS-502 Database management system

Students should be able to

CO502.1	Explain various Data Models with their merits and demerits.
CO502.2	Construct SQL queries using various data manipulation statements.
CO502.3	Apply normalization upto 3NF on given relations.
CO502.4	Summarize concurrency control mechanism for database transactions.
CO502.5	Utilize triggers and cursors in PL/SQL programming.

CO-PO: Mapping for CS-502 Database management system

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO502.1	3	2	-	-	-	-	-	-	1	1	2	2
CO502.2	3	-	3	-	-	-	-	-	1	-	-	2
CO502.3	3	2	2	-	-	-	-	-	1	-	2	2
CO502.4	3	2	-	3	3	3	-	-	1	1	-	2
CO502.5	3	-	3	3	-	-	-	-	1	-	-	2
	3	**2**	**3**	**2**	**3**	**3**	**-**	**-**	**1**	**1**	**2**	**2**

CO-PSO Mapping for CS-502 Database management system

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO502.1	3	-	2	1
CO502.2	3	3	2	-
CO502.3	3	3	2	2
CO502.4	3	-	3	-
CO502.5	3	3	3	-
CO502.6	3	-	3	2
	3	**3**	**3**	**2**

COURSE OUTCOMES for CS-503: Cyber Security

Students should be able to

CO503.1	Classify cyber crime and analyse its challenges
CO503.2	Analyse cryptography with its various techniques
CO503.3	Analyse role of IT act and strategies to apply it against cyber crime
CO503.4	Demonstrate digital signature with its component.
CO503.5	Analyse types and design principle for firewall.

CO-PO: Mapping for CS-503: Cyber Security

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO503.1	3	2	2	1	2	2	-	3	-	-	-	3
CO503.2	3	2	2	1	2	2	-	3	-	-	-	3
CO503.3	3	2	2	1	2	2	-	3	-	-	-	3
CO503.4	3	2	2	1	2	2	-	3	-	-	-	3
CO503.5	3	2	2	1	2	2	-	3	-	-	1	3
	3	**2**	**2**	**1**	**2**	**2**	**-**	**3**	**-**	**-**	**1**	**3**

CO-PSO Mapping for CS-503: Cyber Security

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO503.1	1	1	3	2
CO503.2	1	1	3	2
CO503.3	1	1	3	2
CO503.4	1	1	3	2
CO503.5	1	1	3	2
CO503.6	1	1	3	2
	1	**1**	**3**	**2**

COURSE OUTCOMES for CS-504: IWT Internet and Web Technology
Students should be able to

CO503.1	Describe the concepts of WWW including browser and HTTP protocol
CO503.2	Use the various HTML tags to develop the user friendly web pages
CO503.3	Use CSS to provide the styles to the webpages at various levels.
CO503.4	Demonstrate characteristics of Javascripts for dynamic web pages.
CO503.5	Develop the modern Web applications with client side and server side technologies.

CO-PO: Mapping for CS-504: IWT Internet and Web Technology

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO503.1	3	2	2	1	2	2	-	3	-	-	-	3
CO503.2	3	2	2	1	2	2	-	3	-	-	-	3
CO503.3	3	2	2	1	2	2	-	3	-	-	-	3
CO503.4	3	2	2	1	2	2	-	3	-	-	-	3
CO503.5	3	2	2	1	2	2	-	3	-	-	1	3
	3	**2**	**2**	**1**	**2**	**2**	**-**	**3**	**-**	**-**	**1**	**3**

CO-PSO Mapping for CS-504: IWT Internet and Web Technology

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO503.1	-	1	3	2
CO503.2	-	1	3	-
CO503.3	-	1	3	-
CO503.4	-	1	3	3
CO503.5	-	1	3	2
CO503.6	-	-	3	2
	0	**1**	**3**	**2**

COURSE OUTCOMES for CS-505: Python

Students should be able to

CO505.1	Recall basic concept of programming with Python.
CO505.2	Summerize premitive data structure in Python and application.
CO505.3	Solve statistical problems using python library.
CO505.4	Analyze real world data using visualization methods.
CO505.5	Create and evaluate models for real world problems applicable in recent machine

CO-PO: Mapping for CS-505: Python

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO505.1	3	2	2	1	2	2	-	3	-	-	-	3
CO505.2	3	2	2	1	2	2	-	3	-	-	-	3
CO505.3	3	2	2	1	2	2	-	3	-	-	-	3
CO505.4	3	2	2	1	2	2	-	3	-	-	-	3
CO505.5	3	2	2	1	2	2	-	3	-	-	1	3
	3	**2**	**2**	**1**	**2**	**2**	**-**	**3**	**-**	**-**	**1**	**3**

CO-PSO: Mapping for CS-505: Python

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO306.1	-	2	3	3
CO306.2	-	2	3	3
CO306.3	-	2	3	3
CO306.4	-	2	3	3
CO306.5	-	-	3	3
CO306.6	-	-	3	3
	0	**2**	**3**	**3**

COURSE OUTCOMES for CS-506 Computer Programming V (Unix/Linux Lab)

Students should be able to

CO506.1	Implement installation process for Unix/Linux.
CO506.2	Execute basic commands of Linux OS.
CO506.3	Analyze process states, process scheduling and scheduling priorities.
CO506.4	Implement file creation, file modification and file access permissions
CO506.5	Execute basic Shell Programming assignments

CO-PO: Mapping for CS-506 Computer Programming V (Unix/Linux Lab)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO506.1	3	2	3	-	2	-	-	1	1	1	1	3
CO506.2	3	3	3	-	2	-	2	1	1	2	1	3
CO506.3	3	3	2	-	-	-	-	1	-	1	3	3
CO506.4	3	2	3	-	2	-	-	1	3	2	2	3
CO506.5	3	2	3	-	2	-	2	1	1	2	2	3
	3	**2**	**2**	**-**	**2**	**-**	**2**	**1**	**1**	**2**	**2**	**3**

CO-PSO Mapping for CS-506 Computer Programming V (Unix/Linux Lab)

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO506.1	3	3	2	1
CO506.2	3	3	2	2
CO506.3	3	3	1	1
CO506.4	3	3	2	2
CO506.5	3	3	2	2
CO506.6	3	3	2	1
	3	**3**	**2**	**1**

COURSE OUTCOMES for CS-601 Machine Learning

Students should be able to

CO601.1	Apply knowledge of computing and mathematics to machine learning problems,
CS601.2	Analyze a problem and identify the computing requirements for ML model.
CO601.3	Design and implement an algorithm or ML model for accurate outcome.
CO601.4	Evaluate efficiency and related parameters of various ML models.
CO601.5	Differentiate ML models to demonstrate comprehension of the trade-offs involved.

CO-PO: Mapping for CS-601 Machine Learning

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO601.1	3	3	3	-	2	2	1	-	1	-	2	3
CS601.2	3	3	3	-	2	1	1	-	1	-	-	3
CO601.3	3	3	3	2	2	2	1	-	1	1	-	3
CO601.4	3	3	3	-	2	1	1	-	1	1	2	3
CO601.5	3	3	3	2	3	1	1	2	1	1	2	3
	3	**3**	**3**	**2**	**2**	**1.5**	**1**	**2**	**1**	**1**	**2**	**3**

CO-PSO Mapping for CS-602 Computer Network

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO601.1	3	2	2	2
CS601.2	3	2	2	2
CO601.3	3	2	2	2
CO601.4	3	2	2	2
CO601.5	3	2	2	2
CO601.6	3	2	2	2
	3	**2**	**2**	**2**

COURSE OUTCOMES for CS-602 Computer Network

Students should be able to

CO602.1	Explain computer network protocol hierarchy of OSI and TCP/IP models.
CS602.2	Describe mechanisms of data link layer and related protocols to avoid collision and congestion.
CO602.3	Compare various data transmission protocol.
CO602.4	Evaluate efficiency of various routing algorithms.
CO602.5	Differentiate IPv4 and IPv6 internet protocol.

CO-PO: Mapping for CS-602 Computer Network

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO602.1	3	3	3	-	2	2	1	-	1	-	2	3
CS602.2	3	3	3	-	2	1	1	-	1	-	-	3
CO602.3	3	3	3	2	2	2	1	-	1	1	-	3
CO602.4	3	3	3	-	2	1	1	-	1	1	2	3
CO602.5	3	3	3	2	3	1	1	2	1	1	2	3
	3	**3**	**3**	**2**	**2**	**1.5**	**1**	**2**	**1**	**1**	**2**	**3**

CO-PSO Mapping for CS-602 Computer Network

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO602.1	3	2	2	2
CS602.2	3	2	2	2
CO602.3	3	2	2	2
CO602.4	3	2	2	2
CO602.5	3	2	2	2
CO602.6	3	2	2	2
	3	**2**	**2**	**2**

COURSE OUTCOMES for CS-603 Compiler Design

Students should be able to

CO603.1	Analyze the design of a compiler and the various phases of compiler
CO603.2	Develop lexical analysis phase and its underlying formal models
CO603.3	Illustrate syntax analysis phase and its various parsing techniques
CO603.4	Analyze importance of optimization among the various phases of compiler
CO603.5	Summarize compiler design concepts to generate powerful compiler tools

CO-PO: Mapping for CS-603 Compiler Design

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO603.1	3	2	3	2	-	-	2	-	2	1	1	3
CO603.2	3	2	3	2	-	-	2	-	2	-	1	3
CO603.3	3	2	3	2	-	-	2	-	2	1	1	3
CO603.4	3	2	3	2	2	-	2	-	2	1	1	3
CO603.5	3	2	3	2	2	-	2	-	2	-	1	3
	3	**2**	**3**	**2**	**2**	**0**	**2**	**0**	**2**	**1**	**1**	**3**

CO-PSO Mapping for CS-603 Compiler Design

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO603.1	0	1	-	-
CO603.2	0	1	1	-
CO603.3	0	1	1	-
CO603.4	0	1	1	-
CO603.5	0	1	1	2
CO603.6	0	1	-	2
	0	**1**	**1**	**2**

COURSE OUTCOMES for CS-604 Project Management

Students should be able to

CO604.1	Understand the different activities in software project development
CO604.2	Demonstrate principles of modern software management
CO604.3	Illustrate Life cycle phases of software management process
CO604.4	Understand project organization and responsibilities
CO604.5	Understand process planning and automation

CO-PO: Mapping for CS-604 Project Management

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO604.1	3	2	3	2	-	-	2	-	2	1	1	3
CO604.2	3	2	3	2	-	-	2	-	2	-	1	3
CO604.3	3	2	3	2	-	-	2	-	2	1	1	3
CO604.4	3	2	3	2	2	-	2	-	2	1	1	3
CO604.5	3	2	3	2	2	-	2	-	2	-	1	3
	3	**2**	**3**	**2**	**2**	**0**	**2**	**0**	**2**	**1**	**1**	**3**

CO-PSO Mapping for CS-604 Project Management

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO604.1	3	-	2	-
CO604.2	3	3	2	3
CO604.3	3	3	2	3
CO604.4	3	-	2	-
CO604.5	3	-	3	-
CO604.6	3	3	3	3
	3	**3**	**2**	**3**

COURSE OUTCOMES for CS-605 Data Analytics

Students should be able to

CO605.1	Understand the basic of data analytics using concepts of statistics and probability.
CO605.2	Understand the needs of data processing techniques.
CO605.3	Implement the data analytics techniques using R, MATLAB and Python.
CO605.4	Apply the data analytics techniques in real life applications
CO605.5	Summarize Data analytics with any Case Study of Data Science in healthcare or

CO-PO: Mapping for CS-605 Data Analytics

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO605.1	3	2	3	2	-	-	2	-	2	1	1	3
CO605.2	3	2	3	2	-	-	2	-	2	-	1	3
CO605.3	3	2	3	2	-	-	2	-	2	1	1	3
CO605.4	3	2	3	2	2	-	2	-	2	1	1	3
CO605.5	3	2	3	2	2	-	2	-	2	-	1	3
	3	**2**	**3**	**2**	**2**	**0**	**2**	**0**	**2**	**1**	**1**	**3**

CO-PSO Mapping for CS-605 Cloud Computing

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO605.1	1	2	2	1
CO605.2	1	2	2	2
CO605.3	1	2	2	2
CO605.4	1	2	2	1
CO605.5	1	2	2	2
CO605.6	1	2	2	2
	1	**2**	**2**	**2**

COURSE OUTCOMES for CS-606 Skills Development

Students should be able to

CO606.1	Understand the basics of software as a product and product life cycle
CO606.2	Understand the current requirements of industries and develop required skills
CO606.3	Illustrate design phase and its various techniques contributing product development
CO606.4	Analyze importance of software development skills with respect to real life domains
CO606.5	Summarize skill set to generate powerful software products

CO-PO: Mapping for CS-606 Skills Development

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO606.1	3	2	3	2	-	-	2	-	2	1	1	3
CO606.2	3	2	3	2	-	-	2	-	2	-	1	3
CO606.3	3	2	3	2	-	-	2	-	2	1	1	3
CO606.4	3	2	3	2	2	-	2	-	2	1	1	3
CO606.5	3	2	3	2	2	-	2	-	2	-	1	3
	3	**2**	**3**	**2**	**2**	**0**	**2**	**0**	**2**	**1**	**1**	**3**

CO-PSO Mapping for CS-606 MINOR PROJECT

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO606.1	2	3	2	2
CO606.2	2	3	2	2
CO606.3	2	3	2	2
CO606.4	2	3	2	2
CO606.5	2	3	2	2
CO606.6	2	3	3	2
	2	**3**	**2**	**2**

Fourth Year

COURSE OUTCOMES for CS-701 Software Architecture

Students should be able to

CO701.1	Describe the Fundamental qualities and terminologies of software architecture.
CO701.2	Apply the fundamental principles and guidelines for software architecture design.
CO701.3	Interpret software architectural framework w.r.t. real life domain development.
CO701.4	Use implementation techniques of Software architecture leading to effective product
CO701.5	Illustrate software architecture principles for enterprise application development.

CO-PO: Mapping for CS-701 Software Architecture

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO701.1	3	2	-	-	-	1	2		1	-	1	2
CO701.2	3	3	-	-	-	2	2	-	1	-	-	2
CO701.3	3	-	-	2	-	-	-	-	1	-	-	2
CO701.4	3	-	2	2	-	-	-	-	1	-	-	2
CO701.5	3	3	-	2	-	2	2	-	1	2	-	2
	3	**3**	**2**	**2**	**-**	**1**	**2**		**1**	**2**	**1**	**2**

CO-PSO Mapping for CS-701 Software Architecture

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO701.1	1	-	2	-
CO701.2	1	-	-	-
CO701.3	1	-	-	-
CO701.4	1	-	2	-
CO701.5	1	-	-	-
CO701.6	1	2	1	2
	1	**2**	**2**	**2**

COURSE OUTCOMES for CS-702 Big Data

Students should be able to

CO702.1	Understand the concept and challenges of Big data.
CO702.2	Demonstrate knowledge of big data analytics.
CO702.3	Develop Big Data Solutions using Hadoop Eco System.
CO702.4	Gain hands-on experience on large-scale analytics tools.
CO702.5	Analyse the social network graphs

CO-PO: Mapping for CS-702 Big Data

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO702.1	3	2	-	-	-	1	2		1	-	1	2
CO702.2	3	3	-	-	-	2	2	-	1	-	-	2
CO702.3	3	-	-	2	-	-	-	-	1	-	-	2
CO702.4	3	-	2	2	-	-	-	-	1	-	-	2
CO702.5	3	3	-	2	-	2	2	-	1	2	-	2
CO702.6	3	2	2	-	-	2	2		1	2	1	2
	3	**3**	**2**	**2**	**-**	**1**	**2**		**1**	**2**	**1**	**2**

CO-PSO Mapping for CS-702 Big Data

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO702.1	1	-	2	-
CO702.2	1	-	-	-
CO702.3	1	-	-	-
CO702.4	1	-	2	-
CO702.5	1	-	-	-
CO702.6	1	2	1	2
	1	**2**	**2**	**2**

COURSE OUTCOMES for CS-703: Cryptography and Information Security
Students should be able to

CO703.1	Understanding of the basics of Cryptography and Network Security and working
CO703.2	Understanding of previous attacks on cryptosystems to prevent future attacks from
CO703.3	Knowledge about how to maintain the Confidentiality, Integrity and Availability
CO703.4	Understanding of various protocols for network security to protect
CO703.5	Getting hands-on experience of various Information Security Tools.

CO-PO: Mapping for CS-703: Cryptography and Information Security

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO703.1	3	2	2	1	2	2	-	3	-	-	-	3
CO703.2	3	2	2	1	2	2	-	3	-	-	-	3
CO703.3	3	2	2	1	2	2	-	3	-	-	-	3
CO703.4	3	2	2	1	2	2	-	3	-	-	-	3
CO703.5	3	2	2	1	2	2	-	3	-	-	1	3
	3	**2**	**2**	**1**	**2**	**2**	**-**	**3**	**-**	**-**	**1**	**3**

CO-PSO Mapping for CS-703: Cryptography and Information Security

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO703.1	1	1	3	2
CO703.2	1	1	3	2
CO703.3	1	1	3	2
CO703.4	1	1	3	2
CO703.5	1	1	3	2
CO703.6	1	1	3	2
	1	**1**	**3**	**2**

COURSE OUTCOMES for CS-706 MINOR PROJECT

Students should be able to

CO706.1	Perform functional requirement analysis of respective problem domain.
CO706.2	Design ER Diagram and DFD of proposed project work.
CO706.3	Utilize modern techniques and tools necessary for project work.
CO706.4	Write their project work and conclusions.
CO706.5	Illustrate their project work through formal presentation.
CO706.6	Make a formal presentation of their project work and conclusions.

CO-PO: Mapping for CS-706 MINOR PROJECT

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO706.1	3	3	3	2	2	2	2	-	3	1	3	2
CO706.2	3	3	3	2	2	2	2	-	3	1	3	2
CO706.3	3	3	3	2	2	2	2	3	3	3	3	2
CO706.4	3	3	3	2	2	2	2	3	3	3	3	2
CO706.5	3	3	3	2	2	2	2	3	3	3	3	2
CO706.6	3	2	3	3	3	3	-	2	3	2	2	3
	3	**2**	**2**	**2**	**2**	**2**	**1**	**3**	**3**	**3**	**3**	**3**

CO-PSO Mapping for CS-706 MINOR PROJECT

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO706.1	-	2	2	3
CO706.2	-	2	2	3
CO706.3	-	2	2	3
CO706.4	-	2	2	3
CO706.5	-	2	2	3
CO706.6	-	2	3	3
	0	**2**	**2**	**3**

COURSE OUTCOMES for CS-801 Internet of Things

Students should be able to

CO801.1	Understand Internet of Things and its hardware and software components
CO801.2	Design Interface I/O devices, sensors & communication modules.
CO801.3	Analyze data from various sources in real-time
CO801.4	Monitor data and devices with remote control.
CO801.5	Develop real life IoT based projects.

CO-PO: Mapping for CS-801 Internet of Things

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO801.1	3	3	3	2	2	2	2	-	3	1	3	2
CO801.2	3	3	3	2	2	2	2	-	3	1	3	2
CO801.3	3	3	3	2	2	2	2	3	3	3	3	2
CO801.4	3	3	3	2	2	2	2	3	3	3	3	2
CO801.5	3	3	3	2	2	2	2	3	3	3	3	2
	3	**2**	**2**	**2**	**2**	**2**	**1**	**3**	**3**	**3**	**3**	**3**

CO-PSO Mapping for CS-801 Internet of Things

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO801.1	-	1	1	2
CO801.2	-	1	1	2
CO801.3	-	1	1	2
CO801.4	-	1	2	2
CO801.5	-	1	2	2
CO801.6	-	1	1	2
	0	**1**	**2**	**2**

COURSE OUTCOMES for CS-802 Block chain Technologies (Dept. Elective)

Students should be able to

CO802.1	Understand concepts and terminology of Block chain.
CO802.2	Utilize block chain concepts for crypto currency application.
CO802.3	Classify block chain and compare the types for design issues.
CO802.4	Illustrate the block chain application development with simulator
CO802.5	Understand block chain enabled trade

CO-PO: Mapping for CS-802 Block chain Technologies (Dept. Elective)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO802.1	3	3	3	2	2	2	2	-	3	1	3	2
CO802.2	3	3	3	2	2	2	2	-	3	1	3	2
CO802.3	3	3	3	2	2	2	2	3	3	3	3	2
CO802.4	3	3	3	2	2	2	2	3	3	3	3	2
CO802.5	3	3	3	2	2	2	2	3	3	3	3	2
	3	**2**	**2**	**2**	**2**	**2**	**1**	**3**	**3**	**3**	**3**	**3**

CO-PSO Mapping for CS-802 Blockchain Technologies(Dept Elective)

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO802.1	-	2	3	3
CO802.2	-	2	2	3
CO802.3	-	2	2	2
CO802.4	-	2	3	2
CO802.5	-	2	2	2
CO802.6	-	2	2	2
	0	**2**	**2**	**2**

COURSE OUTCOMES for CS-803 Image Processing and Computer Vision

Students should be able to

CO803.1	Understand practice and theory of computer vision
CO803.2	Elaborate computer vision algorithms, methods and concepts
CO803.3	Implement computer vision systems with emphasis on applications and problem Solving
CO803.4	Apply skills and algorithms for automatic analysis of digital images.
CO803.5	Design and implement real-life problems using Image processing and computer

CO-PO: Mapping for CS-803 Image Processing and Computer Vision

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO803.1	3	3	3	3	-	3	-	-	2	1	-	2
CO803.2	3	3	3	3	-	-	-	-	2	1	-	3
CO803.3		3	3	3	-	-	-	-	2	1	-	3
CO803.4	3	3	3	1	2	3	2	2	2	1	-	3
CO803.5	3	3	2	1	2	-	2	2	2	1	-	3
	3	**3**	**3**	**2**	**2**	**3**	**2**	**2**	**2**	**1**	**-**	**3**

COURSE OUTCOMES for CS-805 Major Project

Students should be able to

CO805.1	Identify functional and non-functional requirements for respective problem domain.
CO805.2	Design algorithmic solution for the proposed project work.
CO805.3	Utilize modern techniques and tools necessary for project work.
CO805.4	Organize project work and conclusions in document form
CO805.5	Demonstrate their project work through formal presentation.

CO-PO: Mapping for CS-805 Major Project

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO805.1	3	3	3	2	3	2	2	-	3	1	3	3
CO805.2	3	3	3	2	3	2	2	-	3	1	3	3
CO805.3	3	3	3	2	3	2	2	3	3	3	3	3
CO805.4	3	3	3	2	3	2	2	2	3	3	3	3
CO805.5	3	3	3	2	2	2	2	2	3	3	3	2
	3	**3**	**3**	**2**	**3**	**2**	**2**	**2**	**3**	**3**	**3**	**3**

CO-PSO Mapping for CS-805 Major Project

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO805.1	-	2	3	3
CO805.2	-	2	3	3
CO805.3	-	2	3	3
CO805.4	-	2	3	3
CO805.5	-	2	3	3
CO805.6	-	2	3	3
	0	**2**	**3**	**3**

Department of Computer Science & Engineering (AI/ML, Data Science)

PROGRAM SPECIFIC OUTCOMES (PSOs)

Student of the AI and ML program will develop:

PSO1: the ability to demonstrate the basic knowledge in Computer Science Core subjects and Artificial Intelligence related domain subjects

PSO2 .the ability to analyze problems in computational domain for intelligent system to design and develop software projects, intelligent systems using AI tools and computer science techniques

PSO3 .the ability to apply learning and knowledge towards lifelong learning and personality development to groom as responsible professional and citizen.

B.Tech. Data Science

PROGRAM SPECIFIC OUTCOMES (PSOs)

Student of the Data Science program will:

PSO1: Attain the ability to design and develop hardware and software based systems, to cater to data repositories, provide creative solutions for data related challenges

PSO2: Gain knowledge in diverse areas of Computer Science and Data Science for successful career, entrepreneurship and higher studies.

PSO3 .Attain the Ability to develop sustainable solutions for real time Data Science applications

Second Year

Course Outcomes AL301/CD301 Technical Communication

Students should be able to

CD301.1	Analyze relevance and importance of communication in a globalized worlds.
CD301.2	Compare types of communication to overcome barriers to communicate
CD301.3	Develop writing and speaking skills with different tools
CD301.4	Prepare for Job interviews with the help of self-assessment techniques
CD301.5	Apply advanced grammar to develop linguistic abilities.

CO-PO: Mapping for AL301/CD301 Technical Communication

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CD301.1	3	3	3	3	-	1	-	1	2	1	-	3
CD301.2	3	3	3	3	-	1	-	-	2	1	-	3
CD301.3	3	2	3	3	-	1	-	-	1	1	1	3
CD301.4	3	3	3	3	-	1	-	1	2	1	-	3
CD301.5	3	3	3	3	1	1	-	-	2	1	1	3
	3	**3**	**3**	**3**	**1**	**1**	**-**	**1**	**2**	**1**	**1**	**3**

CO-PSO Mapping for AL301/CD301 Technical Communication

PSO CO	**PSO1**	**PSO2**	**PSO3**
CD301.1	1	-	2
CD301.2	-	1	2
CD301.3	1	-	2
CD301.4	-	1	2
CD301.5	1	-	2
	0	**1**	**2**

AL302/CD302 Introduction to Probability and Statistics

CD-302 Introduction to Probability and Statistics

Students should be able to

CD302.1	Compute periodic functions by Fourier Series for simple analog communication
CD302.2	Apply Laplace transform to analyze linear time-invariant systems.
CD302.3	Use series solution for second order differential equations in engineering problem.
CD302.4	Use Partial Differential Equations (Heat & Wave equation) to solve complex engineering flow problems.
CD302.5	Understand physical significance of Gradient, Divergence and Curl in complex engineering flow problems.

CO-PO: Mapping for CD-302 Introduction to Probability and Statistics

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CD302.1	3	3	3	3	-	1	-	1	2	1	-	3
CD302.2	3	3	3	3	-	1	-	-	2	1	-	3
CD302.3	3	2	3	3	-	1	-	-	1	1	1	3
CD302.4	3	3	3	3	-	1	-	1	2	1	-	3
CD302.5	3	3	3	3	1	1	-	-	2	1	1	3
	3	**3**	**3**	**3**	**1**	**1**	**-**	**1**	**2**	**1**	**1**	**3**

CO-PSO Mapping for CD-302 Introduction to Probability and Statistics

PSO CO	**PSO1**	**PSO2**	**PSO3**
CD302.1	-	1	2
CD302.2	-	2	2
CD302.3	1	-	2
CD302.4	-	1	2
CD302.5	2	-	2
	0	**1**	**2**

COURSE OUTCOMES AL303/CD303 Data Structures

Students should be able to

CO303.1	Explain stack and queue data structures along with their merits and demerits
CO303.2	Use primitive operations on arrays, structures, stack and queue data structures.
CO303.3	Develop programs to perform primitive operations on linked lists wrt data science
CO303.4	Utilize Dijkstra's algorithm to find spanning tree for a given graph.
CO303.5	Apply quick and merge sorting methods in problem solving related to data science and AIML applications

CO-PO: Mapping for AL303/CD303 Data Structures

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO303.1	3	3	1	-	-	-	-	-	2	-	2	3
CO303.2	3	-	3	-	-	2	-	-	2	-	-	3
CO303.3	3	1	3	2	-	-	-	1	2	-	-	3
CO303.4	3	1	1	2	-	1	-	-	2	2	2	3
CO303.5	3	2	1	-	2	-	-	-	2	2	-	3
	3	**2**	**2**	**2**	**2**	**2**	**-**	**1**	**2**	**2**	**2**	**3**

CO-PSO Mapping for CD303 Data structure

PSO CO	**PSO1**	**PSO2**	**PSO3**
CD303.1	3	2	3
CD303.2	3	2	3
CD303.3	3	2	2
CD303.4	3	2	3
CD303.5	3	2	3
	3	**2**	**3**

COURSE OUTCOMES AL304 Artificial Intelligence

Students should be able to

CO304.1	Compare artificial intelligence techniques A*, Best First Search, Hill climbing.
CO304.2	Apply Intelligent algorithm for problem solving
CO304.3	Analyse standard neural networks ART, Boltzmann machine.

CO304.4	Discuss types of learning and back propagation mechanism
CO304.5	Discuss evolutionary based algorithms and genetic algorithm modules for AI

CO-PO: Mapping for AL304 Artificial Intelligence

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO304.1	3	2	3	3	2	2	-	-	2	1	2	3
CO304.2	3	2	3	3	3	2	-	-	1	1	1	3
CO304.3	3	2	3	3	3	2	-	-	2	1	1	3
CO304.4	3	2	3	3	3	2	-	-	1	1	2	3
CO304.5	3	2	3	3	3	2	-	-	2	1	2	3
	3	**2**	**3**	**2**	**3**	**2**	**-**	**-**	**2**	**1**	**2**	**3**

CO-PSO Mapping for AL304 Artificial Intelligence

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO304.1	1	1	2
CO304.2	-	1	2
CO304.3	-	1	2
CO304.4	1	1	2
CO304.5	-	1	2
	1	**1**	**2**

COURSE OUTCOMES CD304 Database Management System

Students should be able to

CD304.1	Explain various Data Models with their merits and demerits.
CD304.2	Construct SQL queries using various data manipulation statements.
CD304.3	Apply normalization upto 3NF on given relations.
CD304.4	Summarize concurrency control mechanism for database transactions.
CD304.5	Utilize triggers and cursors in PL/SQL programming.

CO-PO: Mapping for CD 304 Database management system

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CD304.1	3	2	-	-	-	-	-	-	1	1	2	2
CD304.2	3	-	3	-	-	-	-	-	1	-	-	2
CD304.3	3	2	2	-	-	-	-	-	1	-	2	2
CD304.4	3	2	-	3	3	3	-	-	1	1	-	2
CD304.5	3	-	3	3	-	-	-	-	1	-	-	2
	3	**2**	**3**	**2**	**3**	**3**	**-**	**-**	**1**	**1**	**2**	**2**

CO-PSO Mapping for CD 304 Database management system

PSO CO	PSO1	PSO2	PSO3
CD304.1	3	-	2
CD304.2	3	3	2
CD304.3	3	3	2
CD304.4	3	-	3
CD304.5	3	3	3
	3	**3**	**3**

COURSE OUTCOMES AL305/CD305 Object Oriented Programming & Methodology

Students should be able to

CD305.1	Compare OOP Languages over conventional Languages using the concept of Object model wrt Data science and AI applications
CD305.2	Implement the OOP features encapsulation and abstraction with C++ classes.
CD305.3	Implement inheritance and its types with C++ and Java programming.
CD305.4	Perform operations with container classes and templates for data science case study
CD305.5	Perform the file handling operations with the help of various class library.

CO-PO: Mapping for CD305 Object Oriented Programming methodology

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CD305.1	3	3	3	2	1	2	2	-	2	1	2	3

CD305.2	3	3	3	1	2	2	2	-	2	1	2	3
CD305.3	3	3	3	2	1	2	2	-	2	1	2	3
CD305.4	3	3	3	2	2	2	2	-	2	1	1	3
CD305.5	3	3	3	1	1	2	2	-	2	1	1	3
	3	**3**	**3**	**2**	**1**	**2**	**2**	**-**	**2**	**1.5**	**2**	**3**

CO-PSO Mapping for CD305 Object Oriented Programming methodology

PSO CO	**PSO1**	**PSO2**	**PSO3**
CD305.1	1	3	2
CD305.2	1	3	2
CD305.3	1	3	2
CD305.4	1	3	2
CD305.5	1	3	2
	1	**3**	**2**

AL306/CD306 Computer Workshop/Introduction to Python-I

COURSE OUTCOMES for CD-306 CW-Python-I

Students should be able to

CD306.1	Explain basic architecture of JAVA and capabilities of Java Language.
CD306.2	Illustrate basic concepts of object oriented programming and apply these concepts with the help of Java Language.
CD306.3	Update and retrieve the data from the database using JDBC connectivity.
CD306.4	Develop the graphical user interaction programs.
CD306.5	Demonstrate development of web based applications with the help of servlets and

CO-PO: Mapping for CD-306 CW-Python-I

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CD306.1	3	3	3	2	2	2	-	-	2	1	1	3
CD306.2	3	3	3	2	2	2	-	-	2	1	1	3
CD306.3		3	3	2	3	2	-	-	3	1	1	3
CD306.4	3	2	3	3	3	2	-	1	3	1	2	3

CD306.5	2	2	3	3	3	2	-	1	3	1	2	3
	3	**3**	**3**	**3**	**2**	**2**	**-**	**1**	**2**	**2**	**1**	**3**

CO-PSO Mapping for CD-306 CW-Python-I

PSO CO	**PSO1**	**PSO2**	**PSO3**
CD306.1	-	2	3
CD306.2	-	2	3
CD306.3	-	2	3
CD306.4	-	2	3
CD306.5	-	-	3
	0	**2**	**3**

AL401/CD401 Introduction to Discrete Structures and Linear Algebra

Students should be able to

CD401.1	Apply the key concepts of Set Theory and also gain knowledge to computer logics.
CD401.2	Construct various Algebraic Structures.
CD401.3	Analyze method of representing mathematical propositional logic and its
CD401.4	Discuss graph theory concepts to solve complex problems.
CD401.5	Describe Possets, Hasse Diagram and Lattices with suitable example. Develop the

CO-PO: Mapping for CD401 Introduction to Discrete Structures and LA

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CD401.1	3	2	1	1	-	2	1	-	1	-	-	2
CD401.2	3	2	1	1	-	2	1	-	1	-	-	2
CD401.3	3	2	1	3	-	2	1	-	1	-	-	2
CD401.4	3	2	1	3	1	2	1	-	1	-	-	2
CD401.5	3	2	1	3	1	2	1	-	1	-	-	2
	3	**2**	**2**	**3**	**1**	**2**	**1**	**-**	**1**	**-**	**-**	**2**

CO-PSO Mapping for CD401 Introduction to Discrete Structures and LA

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CD401.1	-	1	-	-
CD401.2	-	1	-	-
CD401.3	-	1	-	2
CD401.4	-	1	1	2
CD401.5	-	1	1	2
	0	**1**	**1**	**2**

COURSE OUTCOMES for AL402/CD-402 Analysis Design & Algorithms

Students should be able to

CD402.1	Evaluate space and time complexity of merge sort algorithms.
CD402.2	Use greedy strategy to find minimum spanning tree using Prim's algorithm.
CD402.3	Apply backtracking techniques for solving eight-queen problem.
CD402.4	Implement branch and bound methods to solve traveling salesman problem.
CD402.5	Solve knapsack problem using dynamic programming algorithm.

CO-PO: Mapping for CD-402 Analysis Design & Algorithms

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CD402.1	3	3	3	1	-	-	-	-	1	-	2	2
CD402.2	3	3	3	3	2	-	-	-	1	-	2	2
CD402.3	3	3	3	3	2	-	3	-	1	-	2	2
CD402.4	3	3	3	2	-	-	-	-	1	1	2	2
CD402.5	3	3	3	2	2	-	3	-	1	1	2	2
	3	**3**	**3**	**2**	**2**	**-**	**3**	**-**	**1**	**1**	**2**	**2**

CO-PSO Mapping for CD-402 Analysis Design & Algorithms

PSO CO	**PSO1**	**PSO2**	**PSO3**
CD402.1	1	-	2
CD402.2	1	-	2
CD402.3	1	-	2
CD402.4	1	2	2
CD402.5	1	2	2
	1	**2**	**2**

COURSE OUTCOMES for CD-403 Software Engineering

Students should be able to

CD403.1	Compare software development models with their merits and demerits.
CD403.2	Construct Software Requirement Specification with functional and non-functional requirements.
CD403.3	Draw DFD and ERD for application software.
CD403.4	Apply boundary value analysis and equivalence partitioning testing techniques.
CD403.5	Calculate Cyclomatic complexity for given program.

CO-PO: Mapping for CD-403 Software Engineering

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CD403.1	3	3	-	2	3	-	1	2	3	1	3	3
CD403.2	3	3	3	3	2	-	1	2	3	2	3	3
CD403.3	3	3	3	3	2	-	-	-	2	1	3	3
CD403.4	3	-	-	3	3	-	-	-	2	2	3	3
CD403.5	3	-	2	3	3	-	-	-	3	1	3	3
	3	**3**	**2**	**3**	**3**	**-**	**1**	**2**	**3**	**2**	**3**	**3**

CO-PSO Mapping for CD-403 Software Engineering

PSO CO	**PSO1**	**PSO2**	**PSO3**
CD403.1	3	-	2
CD403.2	3	3	2
CD403.3	3	3	2
CD403.4	3	-	2
CD403.5	3	-	3
	3	**3**	**2**

COURSE OUTCOMES AL404 Computer Organization and Architecture/ CD504 Computer Organization and Architecture

Students should be able to

CO404.1	Analyze instruction execution cycle and addressing modes for computer processor.
CO404.2	Analyze computer arithmetic and types of micro-processor.
CO404.3	Describe I/O subsystems
CO404.4	Explain Memory architecture with diagram
CO404.5	Interpret the use of parallel processing in uniprocessor system & multiprocessor architecture.

CO-PO: Mapping for AL404 Computer Organization and Architecture/ CD504 Computer Organization and Architecture

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO404.1	3	2	-	-	-	-	2	-	1	1	-	3
CO404.2	3	2	-	-	-	-	2	-	1	1	-	3
CO404.3		2	-	-	-	-	2	-	1	1	-	3
CO404.4	3	2	-	-	-	-	2	-	1	1	-	3
CO404.5	3	2	2	3	-	-	2	1	1	1	-	3
	3	**2**	**2**	**1**	**-**	**-**	**2**	**1**	**1**	**1**	**-**	**3**

CO-PSO Mapping for AL404 Computer Organization and Architecture/ CD504 Computer Organization and Architecture

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO404.1	1	1	2
CO404.2	-	2	2
CO404.3	1	2	2
CO404.4	1	1	2
CO404.5	-	1	2
	1	**1.5**	**2**

COURSE OUTCOMES for CD-404 Introduction to Data Science

Students should be able to

CO 404.1	Analyze role of data scientist and applications of data science in various domains.
CO 404.2	Apply data preprocessing techniques to sample matrix and dataset
CO 404.3	Perform descriptive statistics method on numerical data
CO 404.4	Develop regression model for prediction and decision making
CO 404.5	Evaluate and test data science models for multiple performance parameters.

CO-PO: Mapping for CD-404 Introduction to Data Science

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 404.1	3	3	-	2	3	-	1	2	3	1	3	3
CO 404.2	3	3	3	3	2	-	1	2	3	2	3	3
CO 404.3	3	3	3	3	2	-	-	-	2	1	3	3
CO 404.4	3	-	-	3	3	-	-	-	2	2	3	3
CO 404.5	3	-	2	3	3	-	-	-	3	1	3	3
	3	**3**	**2**	**3**	**3**	**-**	**1**	**2**	**3**	**2**	**3**	**3**

CO-PSO Mapping for CD-404 Introduction to Data Science

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO 404.1	3	-	2
CO 404.2	3	3	2
CO 404.3	3	3	2
CO 404.4	3	-	2
CO 404.5	3	-	3
	3	**3**	**2**

COURSE OUTCOMES AL405 Machine Learning/ CD502 Machine Learning

Students should be able to

CO405.1	Apply knowledge of computing and mathematics to machine learning problems,
CO405.2	Analyze a problem and identify the computing requirements for ML model.
CO405.3	Design and implement an algorithm or ML model for accurate outcome.
CO405.4	Evaluate efficiency and related parameters of various ML models.
CO405.5	Differentiate ML models to demonstrate comprehension of the trade-offs involved.

CO-PO: Mapping for AL405 Machine Learning/ CD502 Machine Learning

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO405.1	3	3	3	-	2	2	1	-	1	-	2	3
CO405.2	3	3	3	-	2	1	1	-	1	-	-	3
CO405.3	3	3	3	2	2	2	1	-	1	1	-	3
CO405.4	3	3	3	-	2	1	1	-	1	1	2	3
CO405.5	3	3	3	2	3	1	1	2	1	1	2	3
	3	**3**	**3**	**2**	**2**	**1.5**	**1**	**2**	**1**	**1**	**2**	**3**

CO-PSO Mapping for AL405 Machine Learning/ CD502 Machine Learning

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO405.1	3	-	2
CO405.2	3	3	2
CO405.3	3	3	2
CO405.4	3	-	2
CO405.5	3	-	3
	3	**3**	**2**

COURSE OUTCOMES CD405 Operating System/AL501 Operating System

Students should be able to

CO405.1	Compare various types of operating systems
CO405.2	Analyse FCFS, SSTF, SCAN and LOOK disk scheduling algorithm techniques
CO405.3	Implement FCFS, SJF, PRIORITY, RR CPU scheduling algorithm.
CO405.4	Summarize various memory management techniques.
CO405.5	Differentiate between Remote Procedure Call and Remote method invocation.

CO-PO: Mapping for CD405 Operating System/AL501 Operating System

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO405.1	3	3	-	-	-	2	3	-	1	1	1	3
CO405.2	3	3	3	1	-	-	-	-	1	1	1	3
CO405.3	3	3	3	1	-	-	-	-	1	1	1	3
CO405.4	3	3	-	-	2	-	2	-	1	1	1	3
CO405.5	3	3	-	-	2	2	2	-	1	1	1	3
	3	**3**	**2**	**1**	**2**	**2**	**2**	**1**	**2**	**1**	**1**	**3**

CO-PSO Mapping for CD405 Operating System/AL501 Operating System

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO405.1	3	1	1
CO405.2	3	1	1
CO405.3	3	1	1
CO405.4	3	1	1
CO405.5	3	1	2
	3	**1**	**1**

COURSE OUTCOMES AL406 Java Lab

Students should be able to

CO406.1	Explain basic architecture of JAVA and capabilities of Java Language.
CO406.2	Illustrate basic concepts of object oriented programming and apply these concepts with the help of Java Language.
CO406.3	Update and retrieve the data from the database using JDBC connectivity.
CO406.4	Develop the graphical user interaction programs for AI applications
CO406.5	Demonstrate development of web based applications with the help of servlets and

CO-PO: Mapping for AL406 Java Lab

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO406.1	3	3	3	2	2	2	-	-	2	1	1	3
CO406.2	3	3	3	2	2	2	-	-	2	1	1	3
CO406.3		3	3	2	3	2	-	-	3	1	1	3
CO406.4	3	2	3	3	3	2	-	1	3	1	2	3
CO406.5	2	2	3	3	3	2	-	1	3	1	2	3
	3	**3**	**3**	**3**	**2**	**2**	**-**	**1**	**2**	**2**	**1**	**3**

CO-PSO Mapping for AL406 Java Lab

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO405.1	3	1	1
CO405.2	3	1	1
CO405.3	3	1	1
CO405.4	3	1	1
CO405.5	3	1	2
	3	**1**	**1**

CD406 Python-II lab Python for Data Science

Students should be able to

CO406.1	Analyze basic features of python and compare it with other programming language.
CO406.2	Implement primitive and derived data structures with python.
CO406.3	Implement structural and functional programming concept with python.
CO406.4	Implement object oriented programming concept with python.
CO406.5	Illustrate concurrent programming with python.

CO-PO: Mapping for CD406 Python-II lab

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO406.1	3	3	-	-	-	2	3	-	1	1	1	3
CO406.2	3	3	3	1	-	-	-	-	1	1	1	3
CO406.3	3	3	3	1	-	-	-	-	1	1	1	3
CO406.4	3	3	-	-	2	-	2	-	1	1	1	3
CO406.5	3	3	-	-	2	2	2	-	1	1	1	3
	3	**3**	**2**	**1**	**2**	**2**	**2**	**1**	**2**	**1**	**1**	**3**

CO-PSO Mapping for CD406 Python-II lab

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO406.1	3	1	1
CO406.2	3	1	1
CO406.3	3	1	1
CO406.4	3	1	1
CO406.5	3	1	2
	3	**1**	**1**

Third Year

Course outcomes AL502 Database Management System

Students should be able to

CO502.1	Understand the different issues involved in the design and implementation of a database System
CO502.2	Study the physical and logical database designs, database modeling, relational, hierarchical, and network models
CO502.3	Understand and use data manipulation language to query, update, and manage a
CO502.4	Summarize concurrency control mechanism for database transactions.
CO502.5	Design and build a simple database system and demonstrate competence.

CO-PO: Mapping for AL502 Database Management System

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO502.1	3	2	-	-	-	-	-	-	1	1	2	2
CO502.2	3	-	3	-	-	-	-	-	1	-	-	2
CO502.3	3	2	2	-	-	-	-	-	1	-	2	2
CO502.4	3	2	-	3	3	3	-	-	1	1	-	2
CO502.5	3	-	3	3	-	-	-	-	1	-	-	2
	3	**2**	**3**	**2**	**3**	**3**	**-**	**-**	**1**	**1**	**2**	**2**

CO-PSO Mapping for AL502 Database Management System

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO405.1	3	1	1
CO405.2	3	1	1
CO405.3	3	1	1
CO405.4	3	1	1
CO405.5	3	1	2
	3	**1**	**1**

Course outcome AL503 Information Retrieval

Students should be able to

CO503.1	gain an understanding of the basic concepts and techniques in Information Retrieval
CO503.2	understand how statistical models of text can be used to solve problems in IR
CO503.3	appreciate the importance of data structures, such as an index, to allow efficient access to the information in large bodies of text
CO503.4	build a document retrieval system, through the practical sessions
CO503.5	understand the issues involved in providing an IR service on a web scale, including distributed index, recommendation engines.

CO-PO: Mapping for AL503 Information Retrieval

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO503.1	3	2	-	-	-	-	-	-	1	1	2	2
CO503.2	3	-	3	-	-	-	-	-	1	-	-	2
CO503.3	3	2	2	-	-	-	-	-	1	-	2	2
CO503.4	3	2	-	3	3	3	-	-	1	1	-	2
CO503.5	3	-	3	3	-	-	-	-	1	-	-	2
	3	**2**	**3**	**2**	**3**	**3**	**-**	**-**	**1**	**1**	**2**	**2**

CO-PSO Mapping for AL503 Information Retrieval

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO503.1	3	1	1
CO503.2	3	1	1
CO503.3	3	1	1
CO503.4	3	1	1
CO503.5	3	1	2
	3	**1**	**1**

Course outcomes AL504 Natural Language Processing

Students should be able to

CO504.1	Describe the fundamental concepts and techniques of natural language processing
CO504.2	Distinguish among the various techniques, taking into account the assumptions, strengths, and weaknesses of each
CO504.3	Use appropriate descriptions, visualizations, and statistics to communicate the problems and their solutions.
CO504.4	build simple prototype for some AI application such as sentiment analysis
CO504.5	Analyze large volume text data generated from a range of real-world applications.

CO-PO: Mapping for AL504 Natural Language Processing

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO504.1	3	2	-	-	-	-	-	-	1	1	2	2
CO504.2	3	-	3	-	-	-	-	-	1	-	-	2
CO504.3	3	2	2	-	-	-	-	-	1	-	2	2
CO504.4	3	2	-	3	3	3	-	-	1	1	-	2
CO504.5	3	-	3	3	-	-	-	-	1	-	-	2
	3	**2**	**3**	**2**	**3**	**3**	**-**	**-**	**1**	**1**	**2**	**2**

CO-PSO Mapping for AL504 Natural Language Processing

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO504.1	3	1	1
CO504.2	3	1	1
CO504.3	3	1	1
CO504.4	3	1	1
CO504.5	3	1	2
	3	**1**	**1**

Course outcomes CD501 Theory of Computation

Students should be able to

CO501.1	Explain the basic concepts of switching and finite automata theory & languages..
CO501.2	Sketch Finite State Machine and push down automata on various types of languages
CO501.3	Classify various types of languages based on recognizer and generator
CO501.4	Explain recursive and recursively enumerable languages
CO501.5	Relate practical problems of data science to languages, automata, computability and

CO-PO: Mapping for CD-501 Theory of Computation

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO501.1	3	2	3	2	-	-	-	-	2	1	1	2
CO501.2	3	3	3	3	-	-	-	-	2	1	1	2
CO501.3	3	3	3	3	1	-	-	-	2	1	1	2
CO501.4	3	3	2	3	1	-	-	-	2	1	1	2
CO501.5	3	3	2	3	1	-	-	-	2	1	1	2
	3	**3**	**2**	**2**	**1**	**-**	**-**	**-**	**2**	**1**	**1**	**2**

CO-PSO Mapping for CD501 TOC

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO501.1	3	1	1
CO501.2	3	1	1
CO501.3	3	1	1
CO501.4	3	1	1
CO501.5	3	1	2
	3	**1**	**1**

CD503 Introduction to Toolkits for Data Science

Students should be able to

CO503.1	Develop relevant programming abilities for data science applications with toolkits.
CO503.2	Demonstrate proficiency with statistical analysis toolkits of data
CO503.3	Develop the ability to build and assess data-based models.
CO503.4	Execute statistical analyses with professional statistical software.
CO503.5	Apply data science concepts and methods to solve problems in real-world contexts

CO-PO: Mapping for CD503 Introduction to Toolkits for Data Science

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO503.1	3	2	3	2	-	-	-	-	2	1	1	2
CO503.2	3	3	3	3	-	-	-	-	2	1	1	2
CO503.3	3	3	3	3	1	-	-	-	2	1	1	2
CO503.4	3	3	2	3	1	-	-	-	2	1	1	2
CO503.5	3	3	2	3	1	-	-	-	2	1	1	2
	3	**3**	**2**	**2**	**1**	**-**	**-**	**-**	**2**	**1**	**1**	**2**

CO-PSO Mapping for CD503 Introduction to Toolkits for Data Science

PSO CO	**PSO1**	**PSO2**	**PSO3**
CO503.1	3	1	1
CO503.2	3	1	1
CO503.3	3	1	1
CO503.4	3	1	1
CO503.5	3	1	2
	3	**1**	**1**

Department of Electronics & communication Engineering

Program Specific Outcomes (PSO's)

PSO1 Demonstrate ability to apply basic concepts of science and engineering to undertake theoretical learning of Electronic Devices and Circuits, Analog & Digital Communication, Signals & Systems, Embedded Systems, VLSI Design etc.

PSO2 Demonstrate application of acquired hands-on skills such as Circuit Simulation, MATLAB, HDL Programming, Embedded Systems, DSP and PCB Designing etc.

PSO3 Work actively in teams who undertake some research oriented projects, specially development projects and a few industry sponsored projects.

PSO4 Learn extra-curricular courses such as soft-skills, personality development and groom them as responsible citizen with professional ethics blended with human values, engineering economics and sustainability to handle real life problems.

Second Year

COURSE OUTCOMES for BT-301 Engineering Mathematics-III

Students should be able to

CO1	Introduce effective mathematical tools for the Numerical Solution of algebraic and transcendental equations
CO2	Understand numerical differentiation and integration and use numerical techniques to find solution of linear system of equations.
CO3	Work numerically on ODE and PDE using different method through the theory of finite differences
CO4	Discuss Laplace transform, Inverse Laplace transform and Fourier Transform which are used in various branches of engineering
CO5	Acquaint the student with mathematical tools available in Statistics& Probability used in various fields of science and engineering.

CO-PO: Mapping for BT-301 Engineering Mathematics-III

PO CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C301.1	2	2	-	-	-	3	1	1	-	2	-	3
C301.2	2	3	-	-	1	3	2	1	-	1	2	3
C301.3	1	1	2	2	1	3	1	-	3	2	2	2
C301.4	2	1	1	2	1	3	2	1	-	2	2	3
C301.5	3	2	2	2	1	3	1	1	-	2	-	3
	2	**1.80**	**1.67**	**2.00**	**1.00**	**3.00**	**1.40**	**1.00**	**3.00**	**1.80**	**2.00**	**2.80**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	PSO 2	PSO 3	PSO 4
C301.1	2	2	-	1
C301.2	1	2	1	1
C301.3	2	2	1	2
C301.4	2	-	-	2
C301.5	3	-	-	1
	2.00	**2.00**	**1.00**	**1.40**

COURSE OUTCOMES for EC302 Electronic Measurement &Instrumentation

Students should be able to

CO1	To understand the basic concepts and definitions of various parameters of measuring devices, their operations and design of electronic instruments for the measurement of electric quantities viz. current, voltage etc
CO2	To understand the construction and operation of oscilloscope, its basic circuit block and their functions and application and to study various AC bridges and Q – meter
CO3	To acquire the knowledge of various transducers, their characteristics and applications for measurement of physical quantities.
CO4	Ability to understand the techniques used in signal generators and construction and working of various signal generators
CO5	Acquire knowledge of different ADC and DAC techniques their relative advantage and disadvantage and application in electronics instrumentation.

CO-PO: Mapping for EC302 Electronic Measurement &Instrumentation

PO CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C302.1	1	1	2	1	1	1	1	-	-	1	-	1
C302.2	2	2	2	2	1	1	1	1	1	2	1	1
C302.3	2	2	2	2	2	3	2	1	1	1	1	2
C302.4	3	2	2	3	2	1	1	1	2	1	1	2
C302.5	3	2	2	3	2	1	1	2	1	1	-	2
	2.20	**1.80**	**2.00**	**2.20**	**1.60**	**1.40**	**1.20**	**1.25**	**1.25**	**1.20**	**1.00**	**1.60**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C302.1	1	3	1	-
C302.2	1	3	1	-
C302.3	2	3	2	1
C302.4	3	3	2	2
C302.5	3	3	3	2
	2.00	**3.00**	**1.80**	**1.67**

COURSE OUTCOMES for EC303 Digital System Design

Students should be able to

CO1	To understand and examine the structure of various number systems, Boolean
CO2	Understand and design various combinational circuits
CO3	Design various synchronous and asynchronous sequential circuits.
CO4	Analyze and design various registers and counters.
CO5	Classify different semiconductor memories and Programmable Logic Devices

CO-PO: Mapping for EC303 Digital System Design

PO CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C303.1	3	3	3	2	2	1	1	1	1	2	1	2
C303.2	3	3	3	2	3	1	1	1	2	2	1	3
C303.3	3	3	3	3	3	1	1	2	2	2	1	2
C303.4	3	3	3	2	3	1	1	1	2	3	2	3
C303.5	3	2	3	2	2	2	1	1	2	2	2	2
	3	**2.8**	**3**	**2.2**	**2.6**	**1.2**	**1**	**1.2**	**1.8**	**2.2**	**1.4**	**2.4**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	PSO 2	PSO 3	PSO 4
C303.1	3	2	2	2
C303.2	3	3	2	1
C303.3	3	2	3	2
C303.4	2	2	2	1
C303.5	2	2	2	2
	2.6	**2.2**	**2.2**	**1.6**

COURSE OUTCOMES for EC304 Electronic Devices

Students should be able to

CO1	Develop the knowledge of construction and characteristics of various semiconductors devices e.g. diodes, transistors etc.
CO2	Utilize the applications of diodes.
CO3	Distinguish various types of diodes and know their salient parameters.
CO4	Acquire the knowledge of bipolar and unipolar transistors, their operations and
CO5	Develop the knowledge of FET and its construction and characteristics.

CO-PO: Mapping for EC304 Electronic Devices

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C304.1	3	2	2	1	1	2	1	1	2	0	0	3
C304.2	3	2	2	1	1	1	0	1	2	1	0	2
C304.3	3	2	2	1	1	1	0	1	2	1	0	2
C304.4	3	2	2	0	0	1	0	0	2	0	1	2
C304.5	3	2	1	0	0	0	1	0	2	0	2	2
	3	**2**	**1.8**	**0.6**	**0.6**	**1**	**0.4**	**0.6**	**2**	**0.4**	**0.6**	**2.2**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C304.1	3.00	3.00	1.00	2.00
C304.2	3.00	3.00	1.00	2.00
C304.3	3.00	3.00	1.00	2.00
C304.4	3.00	3.00	1.00	2.00
C304.5	3.00	2.00	1.00	2.00
	3	**2.8**	**1**	**2**

COURSE OUTCOMES for EC305 Network Analysis

Students should be able to

CO1	Apply the concept of circuit elements, lumped circuits, circuit laws and reduction techniques.
CO2	Solve the electrical network using mesh and nodal analysis by applying network
CO3	Select appropriate and relevant technique for solving the electrical network in different
CO4	Analyze the transient response of series and parallel A.C. circuits in time domain using

CO-PO: Mapping for EC305 Network Analysis

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C305.1	3	3	3	3	3	1	1	2	3	3	2	1
C305.2	3	3	3	3	3	1	1	2	3	3	2	1
C305.3	3	3	3	3	3	1	1	2	3	3	2	1
C305.4	3	3	3	3	3	1	1	2	3	3	2	1
C305.5	3	3	3	3	3	1	1	2	3	3	2	1
	3	**3**	**3**	**3**	**3**	**1**	**1**	**2**	**3**	**3**	**2**	**1**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C305.1	3	3	3	2
C305.2	3	3	3	2
C305.3	3	3	3	2
C305.4	3	3	3	2
C305.5	3	3	3	2
	3	**3**	**3**	**2**

COURSE OUTCOMES for EC306 EMI Lab

Students should be able to

CO1	To understand the basic concepts and definitions of various parameters of measuring devices, their operations and design of electronic instruments for the measurement of electric quantities viz. current, voltage etc
CO2	To understand the construction and operation of oscilloscope, its basic circuit block and their functions and application and to study various AC bridges and Q – meter
CO3	To acquire the knowledge of various transducers, their characteristics and applications for measurement of physical quantities.
CO4	Ability to understand the techniques used in signal generators and construction and
CO5	Acquire knowledge of different ADC and DAC techniques their relative advantage and disadvantage and application in electronics instrumentation.

CO-PO: Mapping for EMI Lab

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C306.1												
C306.2												
C306.3												
C306.4												
C306.5												

COURSE OUTCOMES for Energy & Environment Engineering ES401

Students should be able to

C401.1	Develop an understanding of various sources of fossil fuel sources and energy storage
C401.2	Identify eco-systems and its importance in food chain
C401.3	Develop an understanding of biodiversity and its conservation at various levels
C401.4	understanding causes of environmental pollution, and its control including disaster
C401.5	Appreciation and understanding of sustainable development including various acts

CO-PO: Mapping for Energy & Environment Engineering ES401

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C401.1	3	3	1	1	1	3	3	1	1	1	1	3
C401.2	3	3	1	1	1	3	3	1	1	1	1	3
C401.3	3	2	1	1	1	3	3	1	1	1	1	3
C401.4	3	3	1	1	1	3	3	2	1	1	1	3
C401.5	3	1	1	1	1	3	3	2	1	1	1	3

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C401.1	3	3	1	1
C401.2	3	3	1	1
C401.3	3	3	1	1
C401.4	3	3	1	1
C401.5	3	3	1	-
Total	**3**	**3**	**1**	**1**

COURSE OUTCOMES for EC402 Signals & Systems

Students should be able to

CO1	Applying the properties of CT and DT signals & systems, analyzing CT systems in Time domain using convolution
CO2	Analyze DT systems using Z Transforms and sketch ROCs
CO3	Determine response of DT Systems using Convolution and its properties
CO4	Evaluating DT systems in the Frequency domain using Fourier analysis tools like
CO5	Design FIR, IIR Discrete Time Systems and Analyze State Space equation for CT &

CO-PO: Mapping for EC402 Signals & Systems

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C402.1	3	3	2	2	3	1	1	1	1	2	1	2
C402.2	3	2	2	2	1	1	1	1	2	2	2	2
C402.3	3	2	2	3	1	2	3	1	1	2	1	1
C402.4	3	3	3	3	2	2	2	1	2	1	2	2
C402.5	3	1	2	2	2	1	1	1	2	1	2	2
	3	**2.2**	**2.2**	**2.4**	**1.8**	**1.4**	**1.6**	**-**	**1.6**	**1.6**	**1.6**	**1.8**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C402.1	3	3	1	1
C402.2	3	3	1	1
C402.3	3	3	1	1
C402.4	3	3	1	1
C402.5	3	3	1	2
	3	**3**	**1**	**1.2**

COURSE OUTCOMES for EC403 Analog Communication

Students should be able to

CO1	Apply Fourier analysis to communication signals and derive the energy or power spectral density of signals
CO2	Sketch the spectrum of amplitude modulated signals, given the baseband spectrum and analyzes various AM techniques
CO3	Differentiate between narrow-band and wide-band angle modulation
CO4	Understand the concept of FM transmitters and Receivers
CO5	Analyze the noise in various analog communication systems

CO-PO: Mapping for EC403 Analog Communication

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 403.1	3	3	2	2	2	1	1	-	2	3	1	3
CO 403.2	3	2	2	2	2	1	1	-	2	3	1	3
CO 403.3	3	3	3	3	2	2	3	-	2	3	1	3
CO 403.4	3	3	3	3	2	2	2	-	2	3	1	3
CO 403.5	3	1	2	2	2	1	1	-	2	3	1	3
	3	**2.4**	**2.4**	**2.4**	**2**	**1.4**	**1.6**	**-**	**2**	**3**	**1**	**3**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
CO 403.1	3	3	1	-
CO 403.2	3	3	1	-
CO 403.3	3	3	1	-
CO 403.4	3	3	1	-
CO 403.5	3	3	1	-
	3	**3**	**1**	-

COURSE OUTCOMES for EC 404 Control Systems

Students should be able to

CO1	Understand the fundamentals of control systems
CO2	Determine and use models of physical systems in forms suitable for use in the
CO3	Express the time and frequency-domain responses of first and second-order systems
CO4	Determine the stability of a closed-loop control system
CO5	Apply root-locus technique to analyze and design control systems

CO-PO: Mapping for EC 404 Control Systems

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C404.1	3	3	2	2	2	1	1	-	2	3	1	3
C404.2	3	2	2	2	2	1	1	-	2	3	1	3
C404.3	3	3	3	3	2	2	3	-	2	3	1	3
C404.4	3	3	3	3	2	2	2	-	2	3	1	3
C404.5	3	1	2	2	2	1	1	-	2	3	1	3
	3.00	**2.40**	**2.40**	**2.40**	**2.00**	**1.40**	**1.60**	**-**	**2.00**	**3.00**	**1.00**	**3.00**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C404.1	3	3	1	-
C404.2	3	3	1	-
C404.3	3	3	1	-
C404.4	3	3	1	-
C404.5	3	3	1	-
	3.00	**3.00**	**1.00**	-

COURSE OUTCOMES for EC405 Analog Circuits

Students should be able to

CO1	Students are able to discuss and analyze feedback amplifiers and oscillator
CO2	Students are able to discuss differential amplifiers, characteristics of OPAMP and interpret data sheet
CO3	Students are able to design and analyze various circuits of OPAMP
CO4	Students are able to discuss, design and analyze the operation of 555 timer and its applications
CO5	Students are able to discuss various voltage regulator circuits implemented using

CO-PO: Mapping for EC405 Analog Circuits

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C405.1	3	3	2	2	2	1	1	-	2	3	1	3
C405.2	3	2	2	2	2	1	1	-	2	3	1	3
C405.3	3	3	3	3	2	2	3	-	2	3	1	3
C405.4	3	3	3	3	2	2	2	-	2	3	1	3
C405.5	3	1	2	2	2	1	1	-	2	3	1	3
	3	**2.4**	**2.4**	**2.4**	**2**	**1.4**	**1.6**	**-**	**2**	**3**	**1**	**3**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C405.1	3	3	1	-
C405.2	3	3	1	-
C405.3	3	3	1	-
C405.4	3	3	1	-
C405.5	3	3	1	-
	3	**3**	**1**	-

COURSE OUTCOMES for EC406 Simulation Lab

Students should be able to

CO1	Develop program using tools in MATLAB
CO2	Use different library functions in MATLAB
CO3	Able to compare graphs in MATLAB software
CO4	Use MATLAB for Research and Development
CO5	Acquire knowledge of mathematical and simulation tools available in MATLAB

CO-PO: Mapping for EC406 Simulation Lab

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C406.1	3	3	-	-	3	-	2	-	-	-	-	2
C406.2	3	3	-	-	2	-	-	-	-	-	-	3
C406.3	3	3	-	-	2	-	-	-	-	-	-	2
C406.4	3	2	3	3	-	-	-	-	-	-	-	3
C406.5	3	3	3	2	-	-	-	-	3	-	-	2
	3	**2.8**	**3**	**2.5**	-	-	**2**	-	**3**	-	-	**2.4**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C406.1	2	3	2	2
C406.2	3	3	2	2
C406.3	3	2	2	2
C406.4	3	3	1	3
C406.5	3	3	1	-
	2.8	**2.8**	**1.6**	**2.25**

Third Year

COURSE OUTCOMES for EC 501 Microprocessor & its Application

Students should be able to

CO1	Apply the fundamentals of assembly language programming of microprocessor and
CO2	Implement microcontroller and microprocessor interfaces including serial ports, ADCs and DACs etc.
CO3	Utilize hardware and software interaction and integration.
CO4	Develop real time embedded systems using microprocessor
CO5	Analyze microprocessor based digital circuits

CO-PO: Mapping for Microprocessor & its Application

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C501.1	3	3	1	1	3	1	1	-	-	3	3	3
C501.2	3	3	3	3	3	1	3	2	2	3	3	3
C501.3	3	3	3	3	3	1	3	2	2	3	3	3
C501.4	3	3	1	1	3	1	1	-	-	3	3	3
C501.5	3	3	3	3	2	1	2	2	2	3	3	3
Total	**3**	**3**	**2.2**	**2.2**	**2.8**	**1**	**2**	**2**	**2**	**3**	**3**	**3**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C501.1	3	2	3	2
C501.2	3	1	3	2
C501.3	3	2	3	2
C501.4	3	2	3	2
C501.5	3	1	3	2
Total	**3**	**1.6**	**3**	**2**

COURSE OUTCOMES for EC 502 Digital Communications

Students should be able to

CO1	Develop the basic concept of random variables and apply the concept to
CO2	Design and develop the mathematics of sampling theorem and digital transmission of analog signals.
CO3	Implementation of different digital modulation techniques used in digital
CO4	Develop the concept of optimum reception of digital signals and calculate the
CO5	Analyze various parameters like information rate, entropy and channel capacity.

CO-PO: Mapping for Digital Communication

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C502.1	3	2	2	2	2	2	1	1	2	2	1	3
C502.2	3	3	2	3	2	2	1	1	3	2	1	3
C502.3	3	3	2	3	2	2	1	1	3	2	1	3
C502.4	3	2	2	2	2	2	1	1	2	2	1	3
C502.5	3	3	3	3	2	2	1	1	3	2	1	3
	3	**2.6**	**2.2**	**2.6**	**2**	**2**	**1**	**1**	**2.6**	**2**	**1**	**3**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C502.1	3	3	2	1
C502.2	3	3	2	1
C502.3	3	3	3	1
C502.4	3	3	1	1
C502.5	3	3	1	1
	3	**3**	**1.8**	**1**

COURSE OUTCOMES for EC 503 CNTL

Students should be able to

CO1	Acquire knowledge of Two Port Network & its Design.
CO2	Acquire knowledge of passive LC filters & their Applications. 3: Acquire knowledge of transmission network & real functions.
CO3	Gain the knowledge for utilization of various Fundamentals of Transmission Line.
CO4	Analysis and distinguish between Line & Circuits.
CO5	Configure the Skills on Cables, Wires & its Application.

CO-PO: Mapping for EC 503 CNTL

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C503.1	3	2	2	1	1	2	1	1	2	-	-	3
C503.2	3	2	2	1	1	1	-	1	2	1	-	2
C503.3	3	2	2	1	1	1	-	1	2	1	-	2
C503.4	3	2	2	-	-	1	-	-	2	-	1	2
C503.5	3	2	1	-	-	-	-	-	2	-	2	2
	3	2	1.8	1	1	1.25	1	1	2	1	1.5	2.2

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	PSO 2	PSO 3	PSO 4
C503.1	3	3	1	2
C503.2	3	3	1	2
C503.3	3	3	1	2
C503.4	3	3	1	2
C503.5	2	2	1	2
	2.8	2.8	1	2

COURSE OUTCOMES for EC 504 (A) EMT (Electro Magnetic (Theory)
Students should be able to

CO1	Understanding the basic concepts of Electromagnetic Theory, scalar and vector quantities and various coordinate systems with electrostatic laws.
CO2	Analyze electrical field intensity & potential, boundary conditions for electric
CO3	Learn static magnetic fields, relation between magnetic flux and magnetic field
CO4	Understand self and mutual inductance; analyze energy stored in magnetic field,
CO5	Learn Electromagnetic Waves, study of waveforms in dielectric and conductors,

CO-PO: Mapping for EC 504 (A) EMT (Electro Magnetic (Theory)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C504.1	2	3	2	1	-	1	-	-	1	1	1	1
C504.2	2	2	2	2	-	-	-	-	1	1	1	-
C504.3	1	3	1	-	-	1	-	-	1	1	1	1
C504.4	2	2	1	1	1	1	1	-	1	1	1	-
C504.5	1	3	1	2	1	1	1	-	1	1	1	-
	1.6	**2.6**	**1.4**	**1.5**	**1**	**1**	**1**	0	**1**	**1**	**1**	**1**

CO's	**Programme Specific Outcomes (PSO's)**			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C504.1	2	1	1	1
C504.2	2	-	-	1
C504.3	2	1	1	-
C504.4	2	1	-	1
C504.5	1	1	-	-
	1.8	**1**	**1**	**1**

COURSE OUTCOMES for EC 505 CNTL Lab

Students should be able to

CO1	Acquire knowledge of Two Port Network & its Design.
CO2	Acquire knowledge of passive LC filters & their Applications. 3: Acquire knowledge
CO3	Gain the knowledge for utilization of various Fundamentals of Transmission Line.
CO4	Analysis and distinguish between Line & Circuits.
CO5	Configure the Skills on Cables, Wires & its Application.

CO-PO: Mapping for EC 505 CNTL Lab

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C505.1	**3**	**2**	**2**	**1**	**1**	**2**	**1**	**1**	**2**	**-**	**-**	**3**
C505.2	**3**	**2**	**2**	**1**	**1**	**1**	**-**	**1**	**2**	**1**	**-**	**2**
C505.3	**3**	**2**	**2**	**1**	**1**	**1**	**-**	**1**	**2**	**1**	**-**	**2**
C505.4	**3**	**2**	**2**	**-**	**-**	**1**	**-**	**-**	**2**	**-**	**1**	**2**
C505.5	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**2**	**2**
	3	**2**	**1.8**	**1**	**1**	**1.25**	**1**	**1**	**2**	**1**	**1.5**	**2.2**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	PSO 2	PSO 3	PSO 4
C505.1	**3**	**3**	**1**	**2**
C505.2	**3**	**3**	**1**	**2**
C505.3	**3**	**3**	**1**	**2**
C505.4	**3**	**3**	**1**	**2**
C505.5	**2**	**2**	**1**	**2**
	2.8	**2.8**	**1**	**2**

COURSE OUTCOMES for EC 506 Mat lab Programming

Students should be able to

CO1	Develop program using tools in MATLAB.
CO2	Use different library functions in MATLAB.
CO3	Able to compare graphs in MATLAB software.
CO4	Acquire knowledge of mathematical and simulation tools available in MATLAB.
CO5	Use MATLAB for Research and Development

CO-PO: Mapping for EC 506 Mat lab Programming

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C506.1	3	2	3	3	3	2	3	2	1	1	2	3
C506.2	3	3	3	3	3	2	3	-	2	1	3	2
C506.3	3	3	3	3	3	2	1	1	3	2	3	1
C506.4	2	2	2	2	1	2	1	-	1	3	2	2
C506.5	2	1	1	1	1	3	2	2	-	-	1	1
	2.60	**2.20**	**2.40**	**2.40**	**2.20**	**2.20**	**2.00**	**1.67**	**1.75**	**1.75**	**2.20**	**1.80**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C506.1	2	2	1	2
C506.2	3	3	1	2
C506.3	1	2	1	3
C506.4	1	1	1	2
C506.5	-	-	-	2
	1.75	**2.00**	**1.00**	**2.20**

COURSE OUTCOMES for EC-507 Evaluation of Internship-II

Students should be able to

CO1	Explore career alternatives prior to graduation.
CO2	Integrate theory and practice.
CO3	Assess interests and abilities in their field of study.
CO4	Learn to appreciate work and its function in the economy.
CO5	Develop work habits and attitudes necessary for job success.

CO-PO: Mapping for EC-507 Evaluation of Internship-II

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C507.1	3	2	3	3	3	2	3	2	1	1	2	3
C507.2	3	3	3	3	3	2	3	-	2	1	3	2
C507.3	3	3	3	3	3	2	1	1	3	2	3	1
C507.4	2	2	2	2	1	2	1	-	1	3	2	2
C507.5	2	1	1	1	1	3	2	2	-	-	1	1
	2.60	**2.20**	**2.40**	**2.40**	**2.20**	**2.20**	**2.00**	**1.67**	**1.75**	**1.75**	**2.20**	**1.80**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C507.1	2	2	1	2
C507.2	3	3	1	2
C507.3	1	2	1	3
C507.4	1	1	1	2
C507.5	-	-	-	2
	1.75	**2.00**	**1.00**	**2.20**

COURSE OUTCOMES for EC 508 Minor Project 1

Students should be able to

CO-PO: Mapping for EC 508 Minor Project 1

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C508.1	3	2	3	3	3	2	3	2	1	1	2	3
C508.2	3	3	3	3	3	2	3	-	2	1	3	2
C508.3	3	3	3	3	3	2	1	1	3	2	3	1
C508.4	2	2	2	2	1	2	1	-	1	3	2	2
C508.5	2	1	1	1	1	3	2	2	-	-	1	1
	2.60	**2.20**	**2.40**	**2.40**	**2.20**	**2.20**	**2.00**	**1.67**	**1.75**	**1.75**	**2.20**	**1.80**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C508.1	2	2	1	2
C508.2	3	3	1	2
C508.3	1	2	1	3
C508.4	1	1	1	2
C508.5	-	-	-	2
	1.75	**2.00**	**1.00**	**2.20**

COURSE OUTCOMES for EC601 Digital Signal Processing

Students should be able to

CO1	Design and analysis of discrete time system described by difference equation
CO2	Implement z transform and configure the block diagram of discrete system
CO3	Develop algorithm for discrete Fourier series and discrete Fourier transforms
CO4	Implement of FFT algorithms
CO5	Implement and analysis the digital filter design techniques. Apply the knowledge

CO-PO: Mapping for EC601 Digital Signal Processing

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C601.1	3	3	3	3	3	-	-	-	2	-	-	2
C601.2	3	3	3	3	3	-	-	-	2	-	-	2
C601.3	2	3	3	3	3	-	-	-	2	-	-	2
C601.4	3	2	3	3	3	-	-	-	2	-	-	2
C601.5	3	3	3	3	3	-	-	-	2	-	-	2
	2.8	**2.8**	**3**	**3**	**3**	-	-	-	**2**	-	-	**2**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C601.1	3	2	2	-
C601.2	3	2	2	-
C601.3	3	2	2	-
C601.4	3	2	2	-
C601.5	3	2	2	-
	3	**2**	**2**	-

COURSE OUTCOMES for EC602 Antenna & Wave propagation

Students should be able to

CO1	Learn fundamental of Antenna and Radiation
CO2	Use of basic electrical and magnetic field radiation concepts applicable on wave
CO3	Distinguish different type of antenna arrays and their radiation pattern
CO4	Learn Antenna array synthesis
CO5	Design antenna operating at different frequencies for different applications and

CO-PO: Mapping for EC602 Antenna & Wave propagation

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C602.1	3	2	2	2	3	2	1	1	2	3	2	3
C602.2	3	2	1	2	3	2	1	1	2	3	2	3
C602.3	3	2	2	2	3	2	1	1	2	3	2	3
C602.4	3	2	2	2	3	2	1	1	2	3	1	3
C602.5	3	2	1	2	3	2	1	1	2	3	1	3
	3	**2**	**1.6**	**2**	**3**	**2**	**1**	**1**	**2**	**3**	**1.6**	**3**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C602.1	3	2	2	1
C602.2	3	3	2	1
C602.3	3	2	2	3
C602.4	3	2	2	3
C602.5	3	3	2	3
	3	**2.4**	**2**	**2.2**

COURSE OUTCOMES for EC603 (A) Data Communication

Students should be able to

CO1	Acquire the knowledge of the fundamental concepts of Data Communication
CO2	Acquire the knowledge of the function of each layer in OSI model
CO3	Gain core knowledge of Error Control and data link Protocols
CO4	Study the basic knowledge to gain expertise in some specific area for network & Frame Relay
CO5	Study the basic taxonomy and terminology of the data communication and

CO-PO: Mapping for EC603 (A) Data Communication

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C603(A).1	3	3	3	2	2	2	1	1	2	2	2	3
C603(A).	3	3	3	2	2	2	1	1	2	2	2	3
C603(A).	3	3	2	2	2	2	2	1	2	2	2	2
C603(A).	3	2	2	2	2	2	1	1	3	1	1	2
C603(A).5	3	3	3	2	3	2	1	-	2	2	1	2
	3	**2.8**	**2.6**	**2**	**2.2**	**2**	**1.2**	**1**	**2.2**	**1.8**	**1.6**	**2.4**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C603(A).1	3	2	3	2
C603(A).2	3	2	3	2
C603(A).3	2	2	3	2
C603(A).4	3	2	3	1
C603(A).5	2	2	3	1
	2.6	**2**	**3**	**1.6**

COURSE OUTCOMES for EC604 (A) Microcontroller & Embedded system

Students should be able to

CO1	Design ADC and DAC, Stepper motor interfacing circuits
CO2	Describe the architecture and instruction set of 8096 microcontroller
CO3	Discuss about microcontrollers embedded processors and their applications
CO4	Describe the architecture of CISC, RISC and ARM microcontroller
CO5	Design I/O interfacing circuit of microcontroller

CO-PO: Mapping for EC604 (A) Microcontroller & Embedded system

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C604.1	3	1	1	1	2	2	1	2	2	2	1	3
C604.2	3	1	1	1	2	2	1	-	2	2	1	3
C604.3	3	1	1	1	2	2	1	-	2	2	2	3
C604.4	3	1	2	1	2	2	1	2	2	2	1	3
C604.5	3	1	3	1	2	2	1	-	2	2	2	3
Total	**3**	**1**	**1.6**	**1**	**2**	**2**	**1**	**2**	**2**	**2**	**1.4**	**3**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C604.1	3	1	2	3
C604.2	3	1	2	3
C604.3	3	1	2	3
C604.4	3	1	2	3
C604.5	3	1	2	3
Total	**3**	**1**	**2**	**3**

COURSE OUTCOMES for EC605 Data Communication Lab

Students should be able to

CO1	Acquire the knowledge of the fundamental concepts of Data Communication
CO2	Acquire the knowledge of the function of each layer in OSI model
CO3	Gain core knowledge of Error Control and data link Protocols
CO4	Study the basic knowledge to gain expertise in some specific area for network & Frame Relay
CO5	Study the basic taxonomy and terminology of the data communication and

CO-PO: Mapping for EC605 Data Communication Lab

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**

COURSE OUTCOMES for EC606 Microcontroller & Embedded system Lab

Students should be able to

CO1	Design ADC and DAC, Stepper motor interfacing circuits
CO2	Describe the architecture and instruction set of 8096 microcontroller
CO3	Discuss about microcontrollers embedded processors and their applications
CO4	Describe the architecture of CISC, RISC and ARM microcontroller
CO5	Design I/O interfacing circuit of microcontroller

CO-PO: Mapping for EC606 Microcontroller & Embedded system Lab

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C604.1	3	1	1	1	2	2	1	2	2	2	1	3
C604.2	3	1	1	1	2	2	1	-	2	2	1	3
C604.3	3	1	1	1	2	2	1	-	2	2	2	3
C604.4	3	1	2	1	2	2	1	2	2	2	1	3
C604.5	3	1	3	1	2	2	1	-	2	2	2	3
Total	**3**	**1**	**1.6**	**1**	**2**	**2**	**1**	**2**	**2**	**2**	**1.4**	**3**

COURSE OUTCOMES for EC608 Minor Project II

Students should be able to

CO1	Utilize the skill set of system integration, presentation, Documentation, project/workshop Management, Problem solving etc. to identify real life problem
CO2	Implement the solution by designation proper hardware and software system
CO3	Judge & execute the problem analysis and develop qualities to work in a team
CO4	Create the leadership quality and develop skills for testing and troubleshooting
CO5	Design to present proper document of technical projects/Workshop

CO-PO: Mapping for EC608 Minor Project II

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C608.1	3	2	3	3	3	2	3	2	1	1	2	3
C608.2	3	3	3	3	3	2	3	-	2	1	3	2
C608.3	3	3	3	3	3	2	1	1	3	2	3	1
C608.4	2	2	2	2	1	2	1	-	1	3	2	2
C608.5	2	1	1	1	1	3	2	2	-	-	1	1
	2.60	**2.20**	**2.40**	**2.40**	**2.20**	**2.20**	**2.00**	**1.67**	**1.75**	**1.75**	**2.20**	**1.80**

CO's	**Programme Specific Outcomes (PSO's)**			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C608.1	2	2	1	2
C608.2	3	3	1	2
C608.3	1	2	1	3
C608.4	1	1	1	2
C608.5	-	-	-	2
	1.75	**2.00**	**1.00**	**2.20**

Fourth Year

COURSE OUTCOMES for EC701 VLSI Design

Students should be able to

CO1	Configure the knowledge of MOS & Various Technology in VLSI Design.
CO2	Developed the skills on various devices modeling of Active/Passive semi component
CO3	Study the Concept of circuit simulation & utilize the concept of various levels.
CO4	Develop their skills on design processing. Study of various register cells will be
CO5	Apply the concept of CMOS processing technology and helps to study latch up and
CO1	Configure the knowledge of MOS & Various Technology in VLSI Design.

CO-PO: Mapping for EC701 VLSI Design

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C701.1	3	2	2	2	2	1	1	-	2	1	1	1
C701.2	3	2	2	3	2	1	1	-	2	1	1	1
C701.3	3	3	2	3	3	1	1	-	2	1	3	1
C701.4	3	2	2	3	2	1	1	-	3	1	1	2
C701.5	3	3	2	2	2	1	1	-	2	1	1	2
	3	**2.4**	**2**	**2.6**	**2.2**	**1**	**1**	0	**2.2**	**1**	**1.4**	**1.4**

CO's	**Programme Specific Outcomes (PSO's)**			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C701.1	2	2	3	1
C701.2	2	2	3	1
C701.3	3	2	3	1
C701.4	2	2	3	1
C701.5	2	2	3	1
	2.2	**2**	**3**	**1**

COURSE OUTCOMES for EC702 (A) Microwave Engg.

Students should be able to

CO1	Distinguish the propagation of different waves and modes in the rectangular waveguide
CO2	Calculate the parameter of different microwave components including ferrite devices
CO3	Develop use of different microwave sources and modulation scheme.
CO4	Utilize the use of different measuring equipment at microwave frequencies.
CO5	Develop knowledge for detection of faults in equipments used at microwave

CO-PO: Mapping for EC702 (A) Microwave Engg.

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C702.1	3	2	2	3	2	3	2	2	2	2	2	2
C702.2	3	3	3	3	2	2	1	2	2	2	2	2
C702.3	2	3	2	2	2	1	1	1	2	2	1	2
C702.4	3	3	2	2	2	2	1	1	2	1	2	2
C702.5	3	2	2	2	2	2	1	1	2	1	2	2
	2.80	**2.60**	**2.20**	**2.40**	**2.00**	**2.00**	**1.20**	**1.40**	**2.00**	**1.60**	**1.80**	**2.00**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	PSO 2	PSO 3	PSO 4
C702.1	2	2	2	1
C702.2	3	2	2	1
C702.3	2	2	2	2
C702.4	3	2	2	2
C702.5	3	2	1	2
	2.60	**2.00**	**1.80**	**1.60**

COURSE OUTCOMES for EC703 (B) Internet of Things

Students should be able to

CO1	Understand in depth about Internet of things
CO2	Establish secure communication for his network for his devices connected in IOT
CO3	Store his data securely on cloud and access it when required
CO4	Design web based application using various internet protocols and services
CO5	Use sensor technology and RFID and wireless networking for maintaining privacy and security concern in smart city and housing environment al considerations.

CO-PO: Mapping for EC703 (B) Internet of Things

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C703.1	3	3	2	3	2	3	2	1	2	2	2	3
C703.2	3	3	3	3	2	2	1	1	2	2	2	3
C703.3	2	3	1	2	2	1	1	1	2	2	1	2
C703.4	3	3	3	3	3	2	1	1	2	2	2	2
C703.5	3	3	2	2	2	2	1	-	2	2	2	2
	2.8	**3**	**2.2**	**2.6**	**2.2**	**2**	**1.2**	**1**	**2**	**2**	**1.8**	**2.4**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C703.1	2	3	3	2
C703.2	3	2	2	2
C703.3	2	2	2	2
C703.4	3	2	2	2
C703.5	3	2	2	2
	2.6	**2.2**	**2.2**	**2**

COURSE OUTCOMES for EC704 Microwave Lab

Students should be able to

CO-PO: Mapping for EC704 Microwave Lab

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C704.1	3	2	2	3	2	3	2	2	2	2	2	2
C704.2	3	3	3	3	2	2	1	2	2	2	2	2
C704.3	2	3	2	2	2	1	1	1	2	2	1	2
C704.4	3	3	2	2	2	2	1	1	2	1	2	2
C704.5	3	2	2	2	2	2	1	1	2	1	2	2
	2.80	**2.60**	**2.20**	**2.40**	**2.00**	**2.00**	**1.20**	**1.40**	**2.00**	**1.60**	**1.80**	**2.00**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C702.1	2	2	2	1
C702.2	3	2	2	1
C702.3	2	2	2	2
C702.4	3	2	2	2
C702.5	3	2	1	2
	2.60	**2.00**	**1.80**	**1.60**

COURSE OUTCOMES for EC705 I.O.T. Lab

Students should be able to

CO-PSO Mapping for EC 705 I.O.T. Lab

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C705.1	3	3	2	3	2	3	2	1	2	2	2	3
C705.2	3	3	3	3	2	2	1	1	2	2	2	3
C705.3	2	3	1	2	2	1	1	1	2	2	1	2
C705.4	3	3	3	3	3	2	1	1	2	2	2	2
C705.5	3	3	2	2	2	2	1	-	2	2	2	2
	2.8	**3**	**2.2**	**2.6**	**2.2**	**2**	**1.2**	**1**	**2**	**2**	**1.8**	**2.4**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C703.1	2	3	3	2
C703.2	3	2	2	2
C703.3	2	2	2	2
C703.4	3	2	2	2
C703.5	3	2	2	2
	2.6	**2.2**	**2.2**	**2**

COURSE OUTCOMES for EC706 Major Project-I

Students should be able to

CO1	Utilize the skill set of system integration, presentation, Documentation, project/workshop Management, Problem solving etc. to identify real life problem
CO2	Implement the solution by designation proper hardware and software system
CO3	Judge & execute the problem analysis and develop qualities to work in a team.
CO4	Create the leadership quality and develop skills for testing and troubleshooting.
CO5	Design to present proper document of technical projects/Workshop.

CO-PO: Mapping for Major Project-I

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C706.1	3	2	3	3	3	2	3	2	1	1	2	3
C706.2	3	3	3	3	3	2	3	-	2	1	3	2
C706.3	3	3	3	3	3	2	1	1	3	2	3	1
C706.4	2	2	2	2	1	2	1	-	1	3	2	2
C706.5	2	1	1	1	1	3	2	2	-	-	1	1
	2.60	**2.20**	**2.40**	**2.40**	**2.20**	**2.20**	**2.00**	**1.67**	**1.75**	**1.75**	**2.20**	**1.80**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C706.1	2	2	1	2
C706.2	3	3	1	2
C706.3	1	2	1	3
C706.4	1	1	1	2
C706.5	-	-	-	2
	1.75	**2.00**	**1.00**	**2.20**

COURSE OUTCOMES for EC 801 Optical Fiber Communication

Students should be able to

CO1	Interpret optical fiber, spectral bands and waveguides.
CO2	Distinguish LED, laser diode and their typical characteristics.
CO3	Utilize working and design of the photo detectors.
CO4	Analyze circuit diagram and know the working of different types of optical receivers
CO5	Learn deployment of optical components in the field.

CO-PO: Mapping for EC 801 Optical Fiber Communication

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C801.1	3	3	2	3	2	3	2	1	2	2	2	3
C801.2	3	3	3	3	2	2	1	2	2	2	2	3
C801.3	2	3	1	2	2	1	1	2	2	2	1	2
C801.4	3	3	3	3	3	2	1	2	2	2	2	2
C801.5	3	3	2	2	2	2	1	1	2	2	2	2
	2.8	**3**	**2.2**	**2.6**	**2.2**	**2**	**1.2**	**1.6**	**2**	**2**	**1.8**	**2.4**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C801.1	2	3	3	2
C801.2	3	2	2	2
C801.3	2	2	2	2
C801.4	3	2	2	2
C801.5	3	2	2	2
	2.6	**2.2**	**2.2**	**2**

COURSE OUTCOMES for EC 802 (B) Wireless Communications

Students should be able to

CO1	Develop the skills on Wireless Communication, its History, Types & Propagation Mechanism.
CO2	Distinguish between various Wireless Channels, Wideband & Directional Channel.
CO3	View the usage of various channel models, Antenna & channels sounding.
CO4	Develop knowledge of Signal processing and distinguish between errors in Channels & Study Transceivers.
CO5	Distinguish between various types of error in the channel and configure the

CO-PO: Mapping for EC 802(B) Wireless Communication

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C802(B).1	3	3	2	3	2	3	2	-	2	2	2	3
C802(B).2	3	3	3	3	2	2	1	-	2	2	2	3
C802(B).	2	3	1	2	2	1	1	-	2	2	1	2
C802(B).4	3	3	3	3	3	2	1	-	2	2	2	2
C802(B).5	3	3	2	2	2	2	1	-	2	2	2	2
	2.8	**3**	**2.2**	**2.6**	**2.2**	**2**	**1.2**	-	**2**	**2**	**1.8**	**2.4**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	PSO 2	PSO 3	PSO 4
C802(B).1	2	3	3	2
C802(B).2	3	2	2	2
C802(B).3	2	2	2	2
C802(B).4	3	2	2	2
C802(B).5	3	2	2	2
	2.6	**2.2**	**2.2**	**2**

COURSE OUTCOMES for EC 803(A) Wireless Network

Students should be able to

CO1	Distinguish wireless network topologies, wireless network operations and security of network.
CO2	Use the principle of mobile data networks: GPRS, CDPD, GSM and their protocols.
CO3	Employ IEEE 802.11 for WLANs, Management of sublayers
CO4	Perform the concept of IEEE 802.15 for WPAN.
CO5	Implement the concept of optical network multiplexing (OADM) and concept of

CO-PO: Mapping for EC 803(A) Wireless Network

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C803(A).1	3	2	2	3	2	2	2	1	3	2	2	2
C803(A).2	3	2	2	3	2	2	1	1	2	2	2	1
C803(A).3	2	3	1	2	2	1	1	1	2	2	1	2
C803(A).4	3	3	3	2	2	2	1	-	2	2	2	2
C803(A).5	3	3	2	2	1	2	1	-	2	2	2	2
	2.8	**2.6**	**2**	**2.4**	**1.8**	**1.8**	**1.2**	**1**	**2.2**	**2**	**1.8**	**1.8**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	PSO 2	PSO 3	PSO 4
C803(A).1	2	2	2	2
C803(A).2	3	2	1	1
C803(A).3	2	2	1	1
C803(A).4	3	2	2	2
C803(A).5	3	2	2	2
	2.6	**2**	**1.6**	**1.6**

OURSE OUTCOMES for EC 804 Adv. Comm lab

Students should be able to

CO1	Distinguish CDMA, cellular CDMA systems and multiuser detection.
CO2	Use of Orthogonal Frequency Division Multiplexing and related topics.
CO3	Interpret the multiple input multiple output antenna systems.
CO4	Distinguish transceiver architecture, interweaving and spectrum sharing.
CO5	Use concept of smart antennas.

CO-PO: Mapping for EC 804 Adv. Comm lab

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C804.1	3	2	3	3	3	2	3	2	1	1	2	3
C804.2	3	3	3	3	3	2	3	-	2	1	3	2
C804.3	3	3	3	3	3	2	1	1	3	2	3	1
C804.4	2	2	2	2	1	2	1	-	1	3	2	2
C804.5	2	1	1	1	1	3	2	2	-	-	1	1
	2.60	**2.20**	**2.40**	**2.40**	**2.20**	**2.20**	**2.00**	**1.67**	**1.75**	**1.75**	**2.20**	**1.80**

CO's	Programme Specific Outcomes (PSO's)			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C804.1	2	2	1	2
C804.2	3	3	1	2
C804.3	1	2	1	3
C804.4	1	1	1	2
C804.5	-	-	-	2
	1.75	**2**	**1**	**2.2**

COURSE OUTCOMES for EC 805 Major Project-II

Students should be able to

CO1	Do literature survey and identify projects aiming at real life problems.
CO2	Design and construct a hardware/ software system to meet desired requirements of the project selected.
CO3	Develop team work by making team mates work in groups.
CO4	Prepare the report so that they should have the idea of documentation in the prescribed format.
CO5	Implement the project keeping in mind the ethical values, safety and environment.

CO-PO: Mapping for EC 804 Adv. Comm lab

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C805.1	3	3	3	2	2	3	3	2	1	1	2	2
C805.2	3	3	3	3	2	3	3	2	2	1	2	2
C805.3	3	3	2	3	3	3	1	1	3	2	2	1
C805.4	2	2	2	2	1	2	1	2	1	3	2	2
C805.5	2	1	1	1	1	3	2	2	1	1	1	1
	2.60	**2.40**	**2.20**	**2.20**	**1.80**	**2.80**	**2.00**	**1.80**	**1.60**	**1.60**	**1.80**	**1.60**

CO's	**Programme Specific Outcomes (PSO's)**			
	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**
C805.1	2	2	1	2
C805.2	3	3	1	2
C805.3	1	2	1	2
C805.4	1	1	1	2
C805.5	2	2	2	2
	1.80	**2.00**	**1.20**	**2.00**

Department of Mechanical Engineering	
Name of the Programme	B.E in Mechanical Engineering
Subject Name	ENGINEERING MATHEMATICS-I I
Subject Code	BE – 301

Second Year

COURSE OUTCOMES, CO

The student will be able to

C301.1	Compute periodic functions by Fourier Series for simple analog communication system.
C301.2	Apply Laplace Transform to analyze linear time-invariant systems.
C301.3	Use series solution for second order differential equations in engineering problem.
C301.4	Use Partial Differential Equations (Heat & Wave equation) to solve complex engineering flow problems.
C301.5	Understand physical significance of Gradient, Divergence and Curl in complex engineering flow problems.
C301.6	Apply line, surface and volume integrals in engineering.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C301.1	3	3	3	3	3	3	2	3	2	2	3	3
C301.2	3	3	3	3	3	3	1	3	2	2	3	3
C301.3	3	2	3	3	3	2	1	3	1	2	1	3
C301.4	3	3	3	3	3	3	1	3	2	2	3	3
C301.5	3	3	3	3	3	3	1	3	2	2	3	3
C301.6	3	3	3	3	3	3	1	3	2	2	3	3
Avg	3.0	2.8	3.0	3.0	3.0	2.8	1.2	3.0	1.8	2.0	2.7	3.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C301.1	3	3	2	1
C301.2	3	3	1	1
C301.3	3	2	2	2
C301.4	3	2	2	2
C301.5	3	2	2	1
C301.6	3	2	1	1

Avg	3.0	2.3	1.7	1.3

Lakshmi Narain College of Technology												
Department of Mechanical Engineering												
Name of course coordinator	Keerti Bundela											
Name of the Programme	B.E in Mechanical Engineering											
Subject Name	Production Process											
Subject Code	ME- 302											
COURSE OUTCOMES, CO												
The student will be able to												
C302.1	Utilise various measuring instruments for performing engg. Measurements.											
C302.2	Apply the knowledge of tool geometry and cutting forces in metal cutting.											
C302.3	Develop pattern and moulds in casting.											
C302.4	Apply the knowledge of tool geometry and cutting forces in metal cutting.											
C302.5	Select appropriate welding in fabrication process.											
C302.6	Adopt the appropriate method of manufacturing for quality, economical and efficient products.											
CO-PO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C302.1	3	2	1	1	1	1	1	1	2	1	1	3
C302.2	3	2	1	1	1	1	1	1	3	1	1	3
C302.3	3	2	2	2	2	2	2	1	3	1	2	3
C302.4	3	2	2	2	1	1	2	1	3	1	2	3
C302.5	3	2	2	1	1	2	2	1	3	1	2	3
C302.6	3	3	3	3	2	3	2	1	3	2	2	3
Avg	3.0	2.2	1.8	1.7	1.3	1.7	1.7	1.0	2.8	1.2	1.7	3.0
Round up	3.0	3.0	2.0	2.0	2.0	2.0	2.0	1.0	3.0	2.0	2.0	3.0

CO-PSO Matrix				
CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C302.1	2	3	1	2
C302.2	3	3	1	2
C302.3	3	3	1	3
C302.4	3	3	2	3
C302.5	3	3	2	3
C302.6	3	3	3	3
Avg	2.8	3.0	1.7	2.7

Round up	3.0	3.0	2.0	3.0

Lakshmi Narain College of Technology	
Department to Mechanical Engineering	
Name of course coordinator	**Sachchida Nand**
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Strength and Mechanics of Materials
Subject Code	ME – 303
COURSE OUTCOMES, CO : ME-303 Strength and Mechanics of Materials	
The student will be able to	
C303.1	Distinguish different properties of materials and compute stress, strain and forces on determinant and indeterminate structures under axial loading conditions.
C303.2	Analyse material under plane stress conditions
C303.3	Compute stresses and analyse the structures such as Beams, Shafts and columns.
C303.4	Analyse the machine parts for stress deformation and deformation under various loading conditions.
C303.5	Apply the criteria of different theories of failure.
C303.6	Analyse the mechanical structure for forces acting on it.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C303.1	3	3	3	3	3	2	3	2	3	3	2	3
C303.2	3	3	3	3	3	2	3	2	2	3	3	3
C303.3	3	3	3	3	3	2	3	2	2	3	2	3
C303.4	3	3	3	3	3	2	2	2	3	2	2	3
C303.5	3	3	3	3	3	2	2	2	3	3	3	3
C303.6	3	3	3	3	3	2	2	2	2	2	2	3
Avg	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**2.0**	**2.5**	**2.0**	**2.5**	**2.7**	**2.3**	**3.0**
Roundup	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**2.0**	**3.0**	**2.0**	**3.0**	**3.0**	**3.0**	**3.0**

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**

C303.1	3	3	3	3
C303.2	3	3	3	3
C303.3	3	3	2	3
C303.4	3	3	2	3
C303.5	3	3	3	2
C303.6	3	3	3	3
Avg	**3.0**	**3.0**	**2.7**	**2.8**
Roundup	**3**	**3**	**3**	**3**

Department of Mechanical Engineering	
Name of course coordinator	Dr. V. N. Bartaria
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Thermodynamics
Subject Code	ME 304
COURSE OUTCOMES, CO	
The student will be able to	
C304.1	Apply the basic concepts of thermodynamics in analysis of closed systems for heat and work transfer.
C304.2	Apply the concepts of second law of thermodynamics and entropy change.
C304.3	Analyze the fuel properties and combustion.
C304.4	Evaluate thermodynamic properties of steam by using steam table and mollier chart.
C304.5	Analyze the system based on air standard cycles.
C304.6	Apply concepts of mathematics in formulation of thermodynamic relations.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C304.1	3	2	3	3	2	2	2	3	2	3	2	3
C304.2	3	3	2	3	2	2	2	3	2	3	3	3
C304.3	3	3	3	2	3	2	2	2	2	2	2	2
C304.4	3	2	2	2	3	1	2	2	1	3	1	2
C304.5	3	2	3	3	2	2	1	2	2	3	1	2

C304.6	3	3	2	3	2	2	1	2	1	2	2	3
Avg	3.0	3.0	3.0	3.0	3.0	2.0	2.0	3.0	2.0	3.0	2.0	3.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C304.1	3	2	2	2
C304.2	2	3	3	2
C304.3	3	2	3	3
C304.4	3	2	3	3
C304.5	3	2	2	3
C304.6	2	2	3	2
Avg	3	3	3	3

Lakshmi Narain College of Technology

Department of Mechanical Engineering

Name of course coordinator	Rajeev Waghdhare
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Machin Drawing and Design
Subject Code	ME- 305

COURSE OUTCOMES, CO

The student will be able to

C305.1	Draw the sectional views of machine components with desired dimensions and conventions
C305.2	Draw the various joints , threads and bearings used in machines.
C305.3	Draw the assembly view of IC engine and lathe machine parts from detailed drawings.
C305.4	Develop the CAD models of various machine components and assembly drawing with the help of CAD software.
C305.5	Apply the design consideration in development of the product,safe,reliable and standardized in application.
C305.6	Design Riveted,welded and threaded joints.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C305.1	3	2	3	1	2	2	2	2	1	2	1	2
C305.2	3	2	1	2	2	2	2	2	1	2	1	2
C305.3	3	1	1	2	3	2	2	2	2	2	2	2

C305.4	3	2	1	1	3	1	2	2	2	2	3	2
C305.5	3	2	2	3	2	3	2	2	2	2	3	3
C305.6	3	2	2	1	2	2	2	3	2	2	2	3
Avg	3.0	1.8	1.7	1.7	2.3	2.0	2.0	2.2	1.7	2.0	2.0	2.3
Roundup	3.0	2.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0	2.0	3.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C508.1	3	2	2	3
C508.2	2	2	1	1
C508.3	2	1	3	2
C508.4	3	2	1	2
C508.5	3	3	3	3
C508.6	3	3	2	3
Avg	2.7	2.2	2.0	2.3
Roundup	3.0	3.0	2.0	3.0

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Prof. Vijay Tirvedi
Name of the Programme	B.E in Mechanical Engineering
Subject Name	CP-III Java
Subject Code	BE 306
COURSE OUTCOMES, CO	
The student will be able to	
CO306.1	Explain basic architecture of JAVA and capabilities of Java Language
CO306.2	Illustrate basic concepts of object oriented programming and apply these concepts with the help of Java Language
CO306.3	Update and retrieve the data from the database using JDBC connectivity
CO306.4	Develop the graphical user interaction programs.
CO306.5	Demonstrate development of web based applications with the help of servlets and JSP

CO 306.6	Execute the program with the feature of exception handling

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO306.1	3	3	3	2	2	2	-	-	2	1	1	3
CO306.2	3	3	3	2	2	2	-	-	2	1	1	3
CO306.3	3	3	3	2	3	2	3	-	3	1	1	3
CO306.4	3	2	3	2	3	2	3	-	3	1	2	3
CO306.5	2	2	3	2	3	2	3	1	3	1	2	3
CO306.6	3	2	3	2	2	2	3	2	3	1	1	3
Avg	2.8	2.5	3.0	2.0	2.5	2.0	3.0	1.5	2.7	1.0	1.3	3.0
Round up	3.0	3.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0	1.0	2.0	3.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
CO306.1	3	3	3	3
CO306.2	3	3	3	3
CO306.3	3	3	3	3
CO306.4	3	3	3	3
CO306.5	3	3	3	3
CO306.6	3	3	3	3
Avg	3.0	3.0	3.0	3.0
Round up	3	3	3	3

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Sanjeet kumar
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Group Discussion / Seminar
Subject Code	ME- 308
COURSE OUTCOMES, CO	
The student will be able to	
C308.1	Apply the strategies of planning and time management.
C308.2	Develop ideas relevant to the nature and significance of discussion
C308.3	Organise his concepts of relevant subject matter for presentation
C308.4	Summarize the points of discussion to arrive at conclusion

C308.5	Challenge ideas of own and others to achieve better idea.
C308.6	Explore better scope of problem solution.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C308.1	1	1	2	2	1	1	2	2	2	1	2	2
C308.2	1	1	1	2	2	2	2	1	3	3	2	2
C308.3	2	2	2	2	2	1	1	1	1	2	2	2
C308.4	1	2	2	2	2	1	2	2	1	3	2	2
C308.5	2	2	1	2	2	2	1	1	2	2	2	2
C308.6	2	2	2	1	2	2	2	1	2	3	1	2
Avg	1.5	1.7	1.7	1.8	1.8	1.5	1.7	1.3	1.8	2.3	1.8	2.0
Roundup	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	2.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C308.1	3	3	2	3
C308.2	2	2	3	3
C308.3	2	3	2	2
C308.4	3	2	2	2
C308.5	3	2	3	2
C308.6	3	2	3	3
Avg	2.7	2.3	2.5	2.5
Roundup	3.0	3.0	3.0	3.0

Lakshmi Narain College of Technology

Department of Mechanical Engineering

Name of course coordinator	
Name of the Programme	B.E in Mechanical Engineering
Subject Name	ENGINEERING MATHEMATICS-III
Subject Code	BE - 401

COURSE OUTCOMES, CO

The student will be able to

C401.1	Evaluation of complex integrals in engineering applications.
C401.2	Use numerical methods to determine approximate solution in engineering.
C401.3	Use interpolation technique to find functional values in engineering.

C401.4	Solve given differential equations by methods of iteration.
C401.5	Find correlation and probability frequency distribution of samples collected from field.
C401.6	Compare the mean & variance of samples by hypothesis testing

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C401.1	3	3	2	3	3	1	1	3	1	2	2	2
C401.2	3	3	2	3	3	1	2	3	1	1	1	2
C401.3	3	3	3	3	3	3	2	3	3	3	3	3
C401.4	3	3	3	3	3	3	2	3	3	3	3	3
C401.5	3	3	3	3	1	2	3	3	3	3	1	2
C401.6	3	3	2	3	3	2	3	3	3	3	3	3
Avg	3.0	3.0	2.5	3.0	2.7	2.0	2.2	3.0	2.3	2.5	2.2	2.5

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C401.1	3	2	1	1
C401.2	3	2	3	2
C401.3	3	2	3	2
C401.4	3	2	1	2
C401.5	3	3	3	2
C401.6	3	3	3	2
Avg	3.0	2.3	2.3	1.8

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Dr. Vipin Sharma
Name of the Programme	B.E in Mechanical Engineering
Subject Name	MATERIAL SCIENCE AND METALLURGY
Subject Code	ME- 402
COURSE OUTCOMES, CO	
The students will be able to	
C301.1	Implement the basic concepts of various categories of materials in different engineering applications.

C302.2	Apply the concepts of plastic deformation of metals to achieve enhanced mechanical properties
C302.3	Utilize the concept of phase diagrams and Iron-Carbon diagram in engineering applications.
C302.4	Implement the principles of heat treatment for improvement in properties of metals.
C302.5	Utilize various ferrous and non ferrous metals in technological applications
C302.6	Implement the technological advancements to improve performance of engineering system and applications.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C302.1	3	3	3	2	1	2	1	_	2	2	1	2
C302.2	3	3	3	2	1	2	_	_	2	2	1	2
C302.3	3	3	2	2	1	2	_	2	2	2	1	2
C302.4	3	3	2	1	1	3	1	2	1	2	1	2
C302.5	3	3	2	1	1	2	_	_	2	2	1	1
C302.6	3	3	3	3	1	2	2	1	2	2	1	3
Avg	3.0	3.0	2.5	1.5	1.0	2.3	0.5	0.6	1.8	2.0	1.0	2.0
Round Up	3.0	3.0	3.0	2.0	1.0	3.0	1.0	1.0	2.0	2.0	1.0	2.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C402.1	3	3	2	1
C402.2	3	3	2	1
C402.3	3	2	2	1
C402.4	3	2	2	1
C402.5	3	2	2	1
C402.6	3	2	2	1
Avg	3.0	2.3	2.0	1.0

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Dr. Neeraj Dubey
Name of the Programme	B.E in Mechanical Engineering
Subject Name	THEORY OF MACHINES AND MECHANISMS
Subject Code	ME -403
COURSE OUTCOMES, CO	
The student will be able to	
C403.1	Distinguish between different types of mechanisms, their motions and applications.

C403.2	Analyse different mechanism on the basis of kinematic principles.
C403.3	Analyse different types of gears on the basis of kinematic principles.
C403.4	Draw cam profile for different cam and follower arrangements.
C403.5	Illustrate gyroscopic effect and compute gyroscopic couple in the cases of ship, airplane and automobile.
C403.6	Discuss kinematic analysis of different mechanisms employed in different machines.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C403.1	3	3	1	1	1	1	2	1	1	2	1	3
C403.2	3	3	2	3	1	1	1	1	1	2	1	3
C403.3	3	3	3	2	1	1	2	2	1	2	1	3
C403.4	3	3	3	3	1	2	2	1	1	1	1	3
C403.5	3	3	3	1	1	1	1	1	1	2	1	3
C403.6	3	3	2	3	2	3	2	2	3	2	1	3
Avg	3.0	3.0	2.3	2.2	1.2	1.5	1.7	1.3	1.3	1.8	1.0	3.0
Round up	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	1.0	3.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C403.1	3	1	2	1
C403.2	3	3	1	1
C403.3	3	2	1	1
C403.4	3	2	1	1
C403.5	3	2	1	1
C403.6	3	3	1	1
Avg	3.0	2.2	1.2	1.0
Round up	3	3	2	1

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Prof. Maneesh Dubey
Name of the Programme	B.E in Mechanical Engineering
Subject Name	THERMAL ENGINEERING & GAS DYNAMICS
Subject Code	ME - 404
COURSE OUTCOMES, CO	

The student will be able to	
C404.1	Prepare a heat balance sheet for a high pressure boiler and evaluate boiler performance.
C404.2	Perform work done and efficiency calculations on phase change cycles.
C404.3	Apply the concepts of gas dynamics in formulating relations for flow through variable area duct.
C404.4	Calculate the value of minimum work input and volumetric efficiency of reciprocating air compressor.
C404.5	Distinguish various heat exchangers and their relative characteristics
C404.6	Apply the basic concepts of mathematics and thermal engineering in formulation of relation for performance of thermal systems.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C404.1	3	3	3	2	2	2	2	2	2	3	1	2
C404.2	3	3	2	2	1	2	2	2	2	2	2	2
C404.3	3	3	3	2	2	2	2	2	2	3	1	2
C404.4	3	3	3	2	2	2	2	2	2	2	2	2
C404.5	3	3	2	2	1	2	2	2	1	2	1	2
C404.6	3	3	3	2	2	2	2	2	2	3	1	2
Avg	3.0	3.0	2.7	2.0	1.6	2.0	2.0	2.0	1.8	2.5	1.3	2.0
Roundup	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	2.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C404.1	3	3	3	2
C404.2	3	3	2	2
C404.3	3	2	3	3
C404.4	3	3	3	2
C404.5	3	2	2	2
C404.6	3	3	3	3
Avg	3.0	2.7	2.7	2.3
Roundup	3	3	3	3

Name of course coordinator	SATISH MALVIYA
Name of the Programme	B.E in Mechanical Engineering
Subject Name	FLUID MECHANICS
Subject Code	ME- 405
COURSE OUTCOMES, CO	
The student will be able to	
C405.1	Apply the concepts of fluid statics and fluid properties in solution of numerical problems of pressure measurement and buoyancy effects of floating and submerged body.
C405.2	Analyse a fluid flow field on kinematic basis.
C405.3	Apply the principles of Dynamics of fluid flow, energy and momentum equations in solution of fluid flow problems.
C405.4	Analyse a model in a fluid field by using the principle of dimensional analysis.
C405.5	Solve the engineering problems involving laminar flow through circular pipes and between parallel plates.
C405.6	Apply the principles of fluid mechanics in design and analysis..

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12
C405.1	3	2	2	3	2	2	1	2	2	2	2	3
C405.2	2	3	2	3	2	1	2	1	1	1	1	1
C405.3	3	2	3	3	2	1	2	2	2	2	2	2
C405.4	2	3	2	2	2	2	1	1	1	2	1	2
C405.5	3	2	2	3	1	1	2	1	2	2	1	2
C405.6	3	3	2	2	2	1	2	2	2	2	2	2
Avg	2.6	2.5	2.1	2.6	1.8	1.3	1.6	1.5	1.6	1.8	1.5	2
Roundup	3	3	3	3	2	2	2	2	2	2	2	2

CO-PSO Matrix

PSO-CO	PSO1	PSO2	PSO3	PSO4	
C405.1	2	2	2	3	
C405.2	3	1	2	1	
C405.3	3	3	3	3	
C405.4	2	1	2	2	
C405.5	2	2	2	2	
C405.6	3	2	3	2	
Avg	2.5	1.8	2.3	2.2	
Roundup	3.0	2.0	3.0	3.0	

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Prof. Vijay Tirvedi
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Computer Programming-IV(.Net Technologies)
Subject Code	BE 406
COURSE OUTCOMES, CO	
The student will be able to	
406.1	Illustrate architecture of the .NET Framework, Common Language Runtime (CLR), Framework Class Library.
406.2	Compare the advantages and disadvantages of procedural, event driven, and object oriented languages.
406.3	Apply advanced features interface,collections with c#
406.4	Develop interaction of front end with database using facilities of .NET platform.
406.5	Design and Implement Desktop based Windows applications using C#.
406.6	Utilize XML, JavaScript in the .NET environment to create Web based applications.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
CO406.1	3	-	-	2	2	2	-	-	2	1	1	2
CO406.2	3	3	-	2	2	2	-	-	2	1	1	3
CO406.3	3	3	3	2	3	2	3	-	3	1	1	3
CO406.4	3	2	3	2	3	2	3	-	3	1	2	3
CO406.5	2	2	3	2	3	2	3	1	3	1	2	1
CO406.6	3	2	3	3	3	3	-	1	3	2	2	3
Avg	2.8	2.4	3.0	2.2	2.7	2.2	3.0	1.0	2.7	1.2	1.5	2.5
Round up	3.0	3.0	3.0	3.0	3.0	3.0	3.0	1.0	3.0	2.0	2.0	3.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
406.1	3	2	1	1
406.2	3	2	1	1

406.3	3	2	1	2
406.4	3	2	1	2
406.5	3	2	1	2
406.6	3	3	3	3
Avg	3.0	2.2	1.3	1.8
Round up	3	3	2	2

Department of Mechanical Engineering	
Name of course coordinator	Prof.Rajeev Singh Chauhan
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Self Study
Subject Code	ME- 407

COURSE OUTCOMES, CO

The students will be able to

C407.1	Use the skill sets necessary for self study
C407.2	Apply the concepts of engineering and mathematics independently in problem solution.
C407.3	Apply principles of ethics in commitment of responsibilities.
C407.4	Organize their work independently with self direction.
C407.5	Develop independent problem solving skills
C407.6	Implement the professional knowledge in solving problems more effectively and focused.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C407.1	1	2	1	1	1	1	1	1	2	3	1	2
C407.2	1	2	2	2	1	1	1	2	2	2	1	2
C407.3	2	1	2	1	2	1	1	1	1	2	2	1
C407.4	1	1	1	1	1	1	2	2	2	2	1	1
C407.5	2	1	1	1	1	1	1	1	1	2	2	1
C407.6	1	2	1	1	1	1	2	1	1	2	1	1
Avg	1.3	1.5	1.3	1.2	1.2	1.0	1.3	1.3	1.5	2.2	1.3	1.3
Roundup	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0	3.0	2.0	2.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C407.1	1	2	2	2
C407.2	1	2	1	2
C407.3	2	2	1	2
C407.4	1	1	2	2
C407.5	2	1	2	2
C407.6	1	2	3	1
Avg	1.3	1.7	1.8	1.8
Roundup	2.0	2.0	2.0	2.0

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Amar Nath Singh
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Group Discussion / Seminar
Subject Code	ME- 408
COURSE OUTCOMES, CO	
The student will be able to	
C408.1	Apply the strategies of planning and time management.
C408.2	Develop ideas relevant to the nature and significance of discussion.
C408.3	Organise his concepts of relevant subject matter for presentation.
C408.4	Summarise the points of discussion to arrive at conclusion.
C408.5	Challenge ideas of own and others to achieve better idea.
C408.6	Explore better scope of problem solution.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C408.1	1	1	2	2	1	1	2	2	2	1	2	2
C408.2	1	1	1	2	2	2	2	1	3	2	2	2
C408.3	2	2	2	2	2	1	1	1	1	3	2	2
C408.4	1	2	2	2	2	1	2	2	1	3	2	2
C408.5	2	2	1	3	3	2	1	3	2	2	2	2
C408.6	2	2	2	1	2	2	2	1	2	3	1	2
Avg	1.5	1.6	1.6	2.0	2.0	1.5	1.6	1.6	1.8	2.3	1.8	2.0

Round up	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	2.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C408.1	3	3	2	3
C408.2	2	2	3	3
C408.3	2	3	2	2
C408.4	3	2	2	2
C408.5	3	2	3	2
C408.6	3	2	3	3
Avg	2.7	2.3	2.5	2.5
Round up	3.0	3.0	3.0	3.0

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Arun Wamankar
Name of the Programme	B.E in Mechanical Engineering
Subject Name	ENTREPRENEURSHIP AND MANAGEMENT CONCEPTS
Subject Code	ME- 501
Third Year	
COURSE OUTCOMES, CO	
The student will be able to	
C501.1	Apply concepts of system and its key components in organisational structure.
C501.2	Apply concepts of management, planning, decision making and perform SWOT analysis.
C501.3	Communicate effectively to achieve marketing goals and perform BEP and financial ratio analysis.
C501.4	Apply the concept of TQM and lean manufacturing.
C501.5	Use the concepts of entrepreneur traits and perform opportunity analysis.
C501.6	Function effectively as an individual and as a member or leader of a team in an organisation.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C501.1	3	1	2	1	1	3	2	2	2	2	3	2
C501.2	3	1	3	3	2	3	2	2	2	3	3	2
C501.3	2	2	3	1	1	3	2	2	2	3	3	2
C501.4	3	2	3	3	1	3	2	2	2	3	3	2

C501.5	3	1	2	1	2	3	2	2	2	2	3	2
C501.6	3	2	2	1	2	3	2	2	2	2	3	2
Avg	2.3	1.3	2.2	1.5	1.2	2.5	1.7	1.7	1.7	2.2	2.5	1.7
Roundup	3.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0	2.0	3.0	3.0	2.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C501.1	1	3	3	3
C501.2	1	3	3	3
C501.3	2	2	3	3
C501.4	2	3	2	3
C501.5	1	3	3	3
C501.6	1	3	3	3
Avg	1.3	2.8	2.8	3.0
Roundup	2.0	3.0	3.0	3.0

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	SATISH MALVIYA
Name of the Programme	B.E in Mechanical Engineering
Subject Name	TURBO MACHINERY
Subject Code	ME- 502

COURSE OUTCOMES, CO

The student will be able to

C502.1	Apply the basic principle of thermodynamic in analysis of turbomachines.
C502.2	Evaluate the performance of steam turbine for varying condition of steam and blade design.
C502.3	Design and evaluate the performance of water turbine and centrifugal pumps .
C502.4	Draw the vector diagram for fans,blower and compressor to calculate the workdone and efficiency.
C502.5	Apply the general theory of turbo machines in various positive displacement machines and hydraulic system application.
C502.6	Implement the concepts of thermodynamic,fluid mechanics and mathematical formation of turbomachines.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C502.1	2	2	1	2	1	1	2	1	1	2	2	2

C502.2	3	2	2	3	2	1	3	2	2	3	2	3
C502.3	3	3	2	3	3	2	3	3	3	3	3	3
C502.4	2	2	2	2	3	2	2	2	2	2	2	2
C502.5	2	3	2	2	2	2	2	3	3	2	3	3
C502.6	3	2	2	3	2	2	3	2	3	1	3	3
Avg	2.5	2.3	1.8	2.5	2.2	1.6	2.5	2.1	2.3	2.1	2.5	2.6
Roundup	3	3	2	3	3	2	3	3	3	3	3	3

CO-PSO Matrix

PSO-CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C502.1	3	2	2	2
C502.2	2	2	2	2
C502.3	3	3	3	3
C502.4	2	2	2	3
C502.5	2	3	2	3
C502.6	3	2	2	3
Avg	2.5	2.3	2.1	2.6
Roundup	3.0	3.0	3.0	3.0

Lakshmi Narain College of Technology

Department of Mechanical Engineering

Name of course coordinator	Arun Wamankar
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Mechanical Measurements and control
Subject Code	ME- 503

COURSE OUTCOMES, CO

The student will be able to

C503.1	Implement basic concept of meteorology and its various fundamental techniques.
C503.2	Distinguish the measuring instruments for the level of precision and accuracy.
C503.3	Apply statistical approach in measurement systems.
C503.4	Use the appropriate type of measuring instrument according to requirements of measurement.
C503.5	Apply various scientific instruments used for the measurements of strain, stress, torque, velocity etc. to identify load calculation.
C503.6	Apply Electromechanical measuring Instruments with appropriate configuration in machines and systems.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**

C503.1	2	1	2	1	2	2	2	1	2	2	2	3
C503.2	3	1	2	2	2	2	2	2	2	2	2	3
C503.3	2	1	3	2	2	2	2	2	2	2	2	2
C503.4	2	1	3	1	2	2	3	2	2	2	2	2
C503.5	3	2	2	2	3	2	2	1	2	3	1	2
C503.6	2	2	2	3	2	2	3	1	2	2	3	3
Avg	2.3	1.3	2.3	1.8	2.2	2.0	2.3	1.5	2.0	2.2	2.0	2.5
Roundup	3.0	2.0	3.0	2.0	3.0	2.0	3.0	2.0	2.0	3.0	2.0	3.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C503.1	2	1	2	2
C503.2	2	2	1	2
C503.3	2	3	2	2
C503.4	2	3	2	2
C503.5	1	1	2	2
C503.6	2	3	2	2
Avg	1.8	2.2	1.8	2.0
Roundup	2.0	3.0	2.0	2.0

Signature with Date

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	R.G.PATIL
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Machine component Design
Subject Code	ME- 504
COURSE OUTCOMES, CO	
The student will be able to	
C504.1	Design a mechanical element according to the causes of stress concentration due to change in regular cross section.
C504.2	Implement the designing and selection procedure of machine shaft by considering the IS standards
C504.3	Apply the design procedure of helical spring and power screw for the said application in industries
C504.4	Design the braking system parts and friction clutch elements.
C504.5	Calculate the bearing forces for selection of bearing from manufacturer's catlogue.

C504.6	Apply the designing methods for simple machine components by following the usual practice of design data book.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C504.1	2	3	3	3	2	2	3	3	2	3	2	2
C504.2	3	3	3	3	2	2	3	3	3	3	3	2
C504.3	2	3	2	3	3	2	3	3	3	2	2	2
C504.4	3	2	2	3	2	3	3	2	3	3	2	3
C504.5	2	2	3	3	3	2	3	3	2	2	2	3
C504.6	2	2	3	3	2	2	3	3	2	3	2	3
Avg.	2.3	2.5	2.7	3.0	2.3	2.2	3.0	2.8	2.5	2.7	2.2	2.5
Round up	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C504.1	3	3	2	3
C504.2	2	3	2	2
C504.3	3	3	2	2
C504.4	2	2	3	2
C504.5	2	3	2	3
C504.6	3	3	3	2
Avg.	2.5	2.8	2.3	2.3
Round up	3.0	3.0	3.0	3.0

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Dr. Neeraj Dubey
Name of the Programme	B.E in Mechanical Engineering
Subject Name	DYNAMICS OF MACHINES
Subject Code	ME -505
COURSE OUTCOMES, CO	

The student will be able to

C505.1	Analyse single slider crank mechanism and flywheel on the basis of dynamic principles.
C505.2	Analyse different types of governors on the basis of dynamic principles.
C505.3	Perform balancing of rotary and reciprocating masses.

C505.4	Apply the principles of friction on bearings, clutches and brakes.
C505.5	Analyse belt and rope drives for power transmission.
C505.6	Discuss the dynamic analysis of different mechanisms and machines.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C505.1	3	3	1	1	1	1	2	1	1	2	1	3
C505.2	3	3	2	3	1	1	1	1	1	2	1	3
C505.3	3	3	3	2	1	1	2	2	1	2	1	3
C505.4	3	3	3	3	1	2	2	1	1	1	1	3
C505.5	3	3	3	1	1	1	1	1	1	2	1	3
C505.6	3	3	2	3	2	3	2	2	3	2	1	3
Avg	3.0	3.0	2.3	2.2	1.2	1.5	1.7	1.3	1.3	1.8	1.0	3.0
Round up	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	1.0	3.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C505.1	3	1	2	1
C505.2	3	3	1	1
C505.3	3	2	1	1
C505.4	3	2	1	1
C505.5	3	2	1	1
C505.6	3	3	1	1
Avg	3.0	2.2	1.2	1.0
Round up	3.0	3.0	2.0	1.0

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Prof. Vijay Tirvedi
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Database Management System
Subject Code	BE 506
COURSE OUTCOMES, CO	
The student will be able to	
CO506.1	Explain RDBMS, Hierarchical and Network Data Model with their merits and demerits.
CO506.2	Construct SQL queries using DDL statements.
CO506.3	Illustrate E-R diagrams and normalization using suitable examples
CO506.4	Summarize database transaction and related database facilities including concurrency control, backup and recovery

CO506.5	Explain various issues related with distributed database management system
CO506.6	Execute DML queries with suitable examples.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO506.1	3	2	2	-	-	3	2	-	2	-	1	2
CO506.2	3	2	3	-	-	-	-	-	2	-	1	2
CO506.3	3	2	3	-	-	-	-	-	2	-	1	3
CO506.4	3	2	3	2	3	-	2	3	2	-	1	3
CO506.5	3	2	3	2	3	3	2	-	2	1	1	3
CO506.6	3	2	3	3	2	2	1	1	2	-	2	3
Avg	3.0	2.0	2.8	2.3	2.7	2.7	1.8	2.0	2.0	1.0	1.2	2.7
Round up	3.0	2.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	1.0	2.0	3.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
CO506.1	3	3	2	2
CO506.2	3	3	2	2
CO506.3	3	3	2	2
CO506.4	3	3	2	2
CO506.5	3	3	2	2
CO506.6	3	3	2	2
Avg	3.0	3.0	2.0	2.0
Round up	3	3	2	2

Lakshmi Narain College of Technology

Department of Mechanical Engineering

Name of course coordinator	Jitendra Singh Rawat
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Self Study
Subject Code	ME- 507

COURSE OUTCOMES, CO

The students will be able to

C507.1	Apply the skill sets necessary for self study.
C507.2	Apply the concepts of engineering and mathematics independently in problem solution.
C507.3	Apply principles of ethics in commitment of responsibilities.
C507.4	Organize their work independently with self direction.
C507.5	Develop independent problem solving skills
C507.6	Implement the professional knowledge in solving problems more effectively and focused.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C507.1	3	3	3	3	2	1	2	2	2	2	1	3
C507.2	3	3	2	2	2	2	2	2	2	3	2	3
C507.3	3	1	2	2	2	1	2	2	1	2	2	2
C507.4	2	1	2	3	2	1	1	2	2	3	2	3
C507.5	3	2	2	2	1	2	2	2	1	2	2	3
C507.6	3	3	3	3	2	2	2	1	2	2	2	2
Avg	2.8	2.2	2.3	2.5	1.8	1.5	1.8	1.8	1.7	2.3	1.8	2.7
	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C507.1	3	3	2	3
C507.2	2	2	3	2
C507.3	1	3	3	2
C507.4	3	2	2	2
C507.5	2	2	1	1
C507.6	2	1	3	2
Avg	2.2	2.2	2.3	2.0
	3.0	3.0	3.0	2.0

Lakshmi Narain College of Technology

Department of Mechanical Engineering

Name of course coordinator	Pramod Kumar Sharma
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Group Discussion / Seminar
Subject Code	ME- 508

COURSE OUTCOMES, CO

The student will be able to

C508.1	Apply strategies of effective time management.
C508.2	Adapt appropriate strategy of presentation of subject matter.
C508.3	Develop ideas using the own thinking or ideas of others.
C508.4	Acquire ideas from discussion.
C508.5	Challenge ideas of own or ideas of others to arrive at better conclusion.
C508.6	Explore better scope of problem solving and goal attainment.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C508.1	2	2	2	3	2	2	3	3	2	2	2	2
C508.2	3	3	1	3	2	2	2	2	3	3	2	2
C508.3	2	3	2	2	2	1	3	3	3	3	2	2
C508.4	3	2	2	2	2	3	2	2	3	3	2	3
C508.5	2	2	3	3	2	2	3	1	3	2	1	3
C508.6	2	2	2	1	1	2	2	2	3	3	2	3
Avg	2.3	2.3	2.0	2.3	1.8	2.0	2.5	2.2	2.8	2.7	1.8	2.5
Round Up	3.0	3.0	2.0	3.0	3.0	2.0	3.0	3.0	2.0	3.0	2.0	3.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C508.1	3	3	2	3
C508.2	2	2	3	3
C508.3	2	3	2	2
C508.4	3	2	2	2
C508.5	3	2	3	3
C508.6	3	2	3	2
Avg	2.7	2.3	2.5	2.5
Round up	3.0	3.0	3.0	3.0

Lakshmi Narain College of Technology

Department of Mechanical Engineering

Name of course coordinator	Devesh Upadhyay
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Operations Management
Subject Code	ME- 601

COURSE OUTCOMES, CO

The students will be able to

C601.1	Apply concepts of management on different operations of an industry.
C601.2	Design a product by applying advanced concepts of product design.
C601.3	Analyse Reliability, Maintainability and Productibility of a product in an industry.
C601.4	Apply the major concepts in the major areas of quality of a product and its production process.
C601.5	Apply the concept of optimization to allocate different plant facilities.
C601.6	Apply decision-support tools to business decision making.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C601.1	2	2	2	3	2	3	2	2	1	3	1	2
C601.2	3	2	3	2	2	2	2	3	3	2	1	2
C601.3	2	3	3	2	2	3	2	2	3	2	2	2
C601.4	2	2	2	1	3	1	3	2	2	3	2	2
C601.5	2	3	3	2	3	3	3	3	3	2	3	1
C601.6	3	3	2	3	3	2	2	2	2	2	2	3
Avg	2.3	2.5	2.5	2.2	2.5	2.3	2.3	2.3	2.3	2.3	1.8	2.0
Roundup	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C601.1	3	2	2	3
C601.2	2	3	2	1
C601.3	2	3	3	2
C601.4	2	2	1	3
C601.5	3	2	3	2
C601.6	3	3	1	3
Avg	2.5	2.5	2.0	2.3
Roundup	3	3	2	3

Lakshmi Narain College of Technology

Department of Mechanical Engineering

Name of course coordinator	Deenoo Pawar
Name of the Programme	B.E in Mechanical Engineering
Subject Name	POWER PLANT ENGINEERING
Subject Code	ME- 602

COURSE OUTCOMES, CO: 602 POWER PLANT ENGINEERING

The student will be able to

C602.1	Distinguish various methods of converting energy sources to electric power.
C602.2	Implement the design principles of thermal power stations in making calculations for system components.
C602.3	Use the principles of nuclear energy conversion for safe, reliable and economics electric energy conversion in Indian context.
C602.4	Apply the hydrological computation for design of hydraulic turbine.
C602.5	Estimate the load calculation for domestic and industrial uses of electricity.
C602.6	Estimate and compute simple problems on cost analysis, economic performance and tariffs.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C602.1	3	2	2	2	1	2	2	2	2	2	2	2
C602.2	3	2	3	1	2	2	2	2	2	2	3	2
C602.3	2	3	2	2	1	1	1	1	2	2	2	2
C602.4	3	2	2	2	2	3	2	2	2	3	2	2
C602.5	2	2	2	1	1	2	1	2	2	2	2	2
C602.6	2	2	1	1	2	2	2	2	1	2	2	2
Avg	2.5	2.2	2.0	1.5	1.5	2.0	1.7	1.8	1.8	2.2	2.2	2.0
Roundup	3	3	2	2	2	2	2	2	2	3	3	2

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C602.1	2	2	1	2
C602.2	2	1	2	2
C602.3	2	2	2	3
C602.4	1	3	2	2
C602.5	1	2	2	3
C602.6	2	3	2	2
Avg	1.7	2.2	1.8	2.3
Roundup	2.0	3.0	2.0	3.0

Signature with

Date

Lakshmi Narain College of Technology												
Department of Mechanical Engineering												
Name of course coordinator	Keshav Singh											
Name of the Programme	B.E in Mechanical Engineering											
Subject Name	Metal cutting & CNC machine											
Subject Code	ME- 603											
COURSE OUTCOMES, CO												
C603.1	Apply the principle of metal cutting with appropriate tool and tool geomatery on lathe machine.											
C603.2	Select the grinding machine with appropriate grinding wheel for specific grinding operation.											
C603.3	Identify different types of milling machine and select a machine for making a job.											
C603.4	Distinguish between drilling and broaching machine and their application.											
C603.5	Apply the knowledge of machining on shaper, gear cutting and rating of machined surface.											
C603.6	Apply the knowledge of mechatronics in machining operation.											
CO-PO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C603.1	3	2	2	2	2	1	1	1	3	2	3	3
C603.2	3	3	1	2	3	2	2	1	3	2	2	3
C603.3	3	3	2	2	3	2	2	1	3	3	2	3
C603.4	3	3	2	2	3	2	2	1	3	2	2	3
C603.5	3	3	2	2	3	2	2	1	3	2	2	3
C603.6	3	3	2	3	3	2	2	1	3	3	2	3
Avg	3.0	2.8	1.8	2.2	2.8	1.8	1.8	1.0	3.0	2.3	2.2	3.0
Roundup	3.0	3.0	2.0	3.0	3.0	2.0	2.0	1.0	3.0	3.0	3.0	3.0
CO-PSO Matrix												
CO	**PSO1**		**PSO2**		**PSO3**		**PSO4**					
C603.1	3		2		3		3					
C603.2	3		2		3		3					
C603.3	3		3		3		3					
C603.4	3		3		3		3					
C603.5	3		2		3		3					
C603.6	3		2		3		3					
Avg	3.0		2.3		3.0		3.0					
Roundup	3.0		3.0		3.0		3.0					

Signature with Date

]

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	AMIT KUMAR KUSHWAHA
Name of the Programme	B.E in Mechanical Engineering
Subject Name	I.C. Engines
Subject Code	ME- 604

COURSE OUTCOMES, CO

The students will be able to

C604.1	Determine engine dimensions and other operating parameters with the help of mathematical equations.
C604.2	Apply the principle of combustion in S.I. engines for determination of effect of detonation on engine and its remedy.
C604.3	Apply the concepts of combustion in C.I. engines for solving problems on design of various types of combustion chambers.
C604.4	Solve numerical problems pertaining to various I.C. engine systems.
C604.5	Apply the principle of supercharging in I.C. engines for its performance analysis.
C604.6	Analyse an I.C. engine for its performance and design modification.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C604.1	3	3	3	2	2	2	1	1	2	3	2	2
C604.2	3	3	3	2	2	3	3	2	3	3	2	2
C604.3	3	3	3	2	2	3	1	2	2	3	2	2
C604.4	3	3	2	1	2	1	1	1	2	3	2	2
C604.5	3	3	3	2	1	2	2	2	2	3	3	2
C604.6	3	3	3	2	2	3	3	2	3	3	2	2
Avg	3.0	3.0	2.8	1.8	1.8	2.3	1.8	1.7	2.3	3.0	2.2	2.0
Round-up	3.0	3.0	3.0	2.0	2.0	3.0	2.0	2.0	3.0	3.0	3.0	2.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C604.1	2	2	2	3
C604.2	2	3	1	1
C604.3	3	2	3	2
C604.4	2	2	1	2

C604.5	3	3	3	2
C604.6	3	3	2	3
Avg	2.5	2.5	2.0	2.1
Round-up	3.0	3.0	2.0	3.0

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Madan Mohan Sahu
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Heat and Mass Transfer
Subject Code	ME- 605
COURSE OUTCOMES, CO	

The student will be able to

C605.1	Apply the concepts of heat transfer to analyse the heat transfer problems based on conduction mode.
C605.2	Implement the mathematical models for extended surfaces and unsteady heat conduction for the solution of engineering problems
C605.3	Develop correlations for different heat transfer problems using dimensional analysis
C605.4	Design the Heat Exchanger
C605.5	Utilize the principles of mass transfer in solving problems involving mass diffusion
C605.6	Analyse the problems of heat transfer by radiation mode , boiling and condensation.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C605.1	3	3	2	1	1	1	1	2	2	2	1	3
C605.2	3	3	2	1	1	2	2	2	2	2	1	3
C605.3	3	3	3	1	2	2	2	2	2	2	1	3
C605.4	3	3	3	2	2	2	2	3	2	2	1	3
C605.5	3	3	2	1	2	1	1	2	2	2	1	3
C605.6	3	3	2	2	2	2	2	2	2	2	1	3
Avg	3.0	3.0	2.3	1.3	1.7	1.7	1.7	2.2	2.0	2.0	1.0	3.0
Roud-up	3.0	3.0	3.0	2.0	2.0	2.0	2.0	3.0	2.0	2.0	1.0	3.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C605.1	3	2	3	3
C605.2	3	2	2	3
C605.3	3	3	2	3
C605.4	3	2	2	3
C605.5	3	2	3	3
C605.6	3	3	2	3
Avg	3.0	2.3	2.3	3.0
Roud-up	3	3	3	3

Signature with Date

Lakshmi Narain College of Technology

Department of Mechanical Engineering

Name of course coordinator	Dr. Shalendra Dwivedi
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Computer Aided Engineering
Subject Code	ME- 606

COURSE OUTCOMES, CO

The student will be able to

C606.1	Solve complex engineering problems using mathematical Models.
C606.2	Apply the concepts of static and dynamics analysis for solving complex engineering problems.
C606.3	Apply the different principle of meshing for obtaining solutions by Finite Element Methods.
C606.4	Apply the techniques of post processing in engineering problems to obtain results.
C606.5	Develop the design of mechanical components with consideration of criteria of failure.
C606.6	Apply methods of solving engineering problems analytically, numerically and experimentally in getting solution with useful information

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C606.1	3	3	3	3	3	3	2	1	2	3	2	3
C606.2	2	3	3	3	3	3	3	1	2	3	1	3
C606.3	3	2	3	3	3	2	1	1	1	3	1	3
C606.4	3	3	3	3	3	1	1	1	2	3	1	3
C606.5	3	3	3	3	3	1	3	1	1	3	1	3
C606.6	3	3	3	3	3	3	2	1	2	3	1	3
Avg	2.8	2.8	3.0	3.0	3.0	2.2	2.0	1.0	1.7	3.0	1.2	3.0
Roud-up	3.0	3.0	3.0	3.0	3.0	3.0	2.0	1.0	2.0	3.0	2.0	3.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C606.1	3	3	1	2
C606.2	3	3	1	2
C606.3	3	3	2	2
C606.4	3	3	2	2
C606.5	3	3	2	2
C606.6	3	3	2	2
Avg	3.0	3.0	1.7	2.0
Roud-up	3	3	2	2

Signature with Date

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Jitendra Singh Rawat
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Self Study
Subject Code	ME- 607

COURSE OUTCOMES, CO

The students will be able to

C607.1	Apply the skill sets necessary for self study.
C607.2	Apply the concepts of engineering and mathematics independently in problem solution.
C607.3	Apply principles of ethics in commitment of responsibilities
C607.4	Organize their work independently with self direction.
C607.5	Develop independent problem solving skills
C607.6	Implement the professional knowledge in solving problems more effectively and focused.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C607.1	3	3	3	2	2	2	2	2	2	2	2	3
C607.2	3	2	2	3	2	2	2	1	1	1	1	2
C607.3	3	3	2	2	1	2	2	2	2	2	2	2
C607.4	2	2	2	2	2	1	1	2	2	3	3	1
C607.5	3	1	2	1	2	2	2	2	1	2	1	3
C607.6	3	3	1	3	2	2	1	2	2	2	1	1
Avg	2.8	2.3	2.0	2.2	1.8	1.8	1.7	1.8	1.7	2.0	1.7	2.0
	3.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C607.1	2	2	2	3
C607.2	2	2	2	2
C607.3	2	1	3	1
C607.4	1	3	2	3
C607.5	1	2	1	1

C607.6	2	3	3	2
Avg	1.7	2.2	2.2	2.0
	2.0	3.0	3.0	2.0

Signature with Date

Lakshmi Narain College of Technology	
Department to Mechanical Engineering	
Name of course coordinator	Dharam Singh
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Seminar And Group Discussion
Subject Code	ME - 608
COURSE OUTCOMES, CO : ME-608 Seminar And Group Discussion	
The student will be able to	
C608.1	Apply strategies of effective time management
C608.2	Adapt appropriate strategy of presentation of subject matter
C608.3	Develop ideas using the own thinking or ideas of others
C608.4	Acquire ideas from discussion.
C608.5	Challenge ideas of own or ideas of others to arrive at better conclusion
C608.6	Explore better scope of problem solving and goal attainment.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C608.1	1	1	1	1	2	2	3	2	3	2	2	3
C608.2	1	2	1	3	2	2	2	2	3	2	3	3
C608.3	2	2	2	2	3	1	3	2	3	2	2	2
C608.4	2	1	1	2	2	3	2	2	3	2	3	3
C608.5	2	2	2	3	3	2	3	3	3	2	2	3
C608.6	2	3	2	1	2	2	2	3	3	3	2	3
Avg	1.7	1.8	1.5	2.0	2.3	2.0	2.5	2.3	3.0	2.2	2.3	2.8
Roundup	2.0	2.0	2.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C608.1	3	3	2	3
C608.2	2	2	3	3
C608.3	2	3	2	2
C608.4	3	2	2	2
C608.5	3	2	3	3
C608.6	3	2	3	2
Avg	2.7	2.3	2.5	2.5
Roundup	3	3	3	3

Signature with Date

Name of course coordinator	Manish Baweja
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Workstudy and ergonomics
Subject Code	ME- 701

Fourth Year

COURSE OUTCOMES, CO

The students will be able to	
C701.1	Apply the principle of work-study in development of improved working procedure
C701.2	Analyse the work contents, rate a worker, calculate the wages and implement the incentive wage plan.
C701.3	Analyse and calculate time for any job or work, consideration of different types of allowances.
C701.4	Evaluate the occupational environment factors like stress, noise and vibration in the industry level.
C701.5	Use the various display system and apply them in industry.
C701.6	Apply the concepts of work-study &Ergonomics to increase the productivity & reduce cost of Production.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C701.1	2	2	3	3	2	2	3	2	3	2	3	3
C701.2	2	2	3	2	2	3	2	3	3	2	3	2
C701.3	2	2	2	2	2	2	2	3	3	2	1	2
C701.4	2	2	2	2	3	3	3	1	2	1	2	2
C701.5	2	1	2	1	1	3	2	1	2	1	2	2

C701.6	3	3	3	2	2	3	3	3	3	2	3	3
Avg	2.2	2.0	2.5	2.0	2.0	2.7	2.5	2.2	2.7	1.7	2.3	2.3
Roundup	3.0	2.0	3.0	2.0	2.0	3.0	3.0	3.0	3.0	2.0	3.0	3.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C701.1	3	3	1	3
C701.2	2	2	2	3
C701.3	2	2	2	2
C701.4	2	2	2	3
C701.5	1	3	2	2
C701.6	2	3	2	3
Avg	2.0	2.5	1.8	2.7
Roundup	2.0	3.0	2.0	3.0

Signature with Date

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Dr. Vipin Shrivastava
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Renewable energy system
Subject Code	ME -702
COURSE OUTCOMES, CO	

The student will be able to

C702.1	Apply concepts of solar radiation in solar photovoltaic and solar thermal applications.
C702.2	Interpret the wind energy characteristics for wind energy applications.
C702.3	Apply the method of biomass production for design and operation of biogas plant.
C702.4	Distinguish hydro power systems and their components in power generation and principle of ocean energy.
C702.5	Apply the principles of Geothermal energy and Hydrogen energy in power generation.
C702.6	Apply the methods of non conventional energy generation to generate power with consideration of environmental protection to give benefit to individual, society and industry

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO702.1	3	2	2	3	1	2	3	2	1	2	1	1
CO702.2	3	2	2	2	1	2	3	2	2	2	1	1
CO702.3	3	2	3	3	2	2	2	2	1	2	1	1
CO702.4	2	2	2	2	1	2	2	1	1	1	1	1
CO702.5	2	2	2	2	1	2	2	1	1	1	1	1
CO702.6	3	2	3	2	1	2	3	1	1	1	1	1
Avg	2.7	2	2.3	2.3	1.2	2	2.5	1.5	1.2	1.5	1	1
Round up	3.0	2.0	3.0	3.0	2.0	2.0	3.0	2.0	2.0	2.0	1.0	1.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C702.1	1	2	3	2
C702.2	1	1	1	2
C702.3	3	2	2	2
C702.4	3	1	1	2
C702.5	3	2	2	2
C702.6	3	2	2	2
Avg	2.3	1.7	1.8	2.0
Round up	3.0	2.0	2.0	2.0

Signature with Date

Lakshmi Narain College of Technology	
Department to Mechanical Engineering	
Name of course coordinator	**Vikas Ranjan Singh**
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Mechanical Vibration and Noise Engineering
Subject Code	ME - 703
COURSE OUTCOMES, CO : ME-703 Mechanical Vibration and Noise Engineering	

The student will be able to

C703.1	Analyse the vibrating mass under the action of simple harmonic forces.
C703.2	Analyse under damped, over damped and critically damped systems and solve problems on damped free vibrations.
C703.3	Examine the systems under transverse vibrations.
C703.4	Examine the natural frequency of vibrations of systems with two degree of freedom.

C703.5	Apply the noise control techniques in domestic and industrial applications.
C703.6	Analyse a vibratory system to determine natural frequency by using Rayleigh's method.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C703.1	3	3	2	1	1	1	1	1	2	2	1	3
C703.2	3	3	2	2	1	1	1	1	2	2	1	3
C703.3	3	3	2	2	1	1	1	1	2	2	1	3
C703.4	3	3	2	2	1	1	1	1	2	2	1	3
C703.5	3	3	2	2	1	2	2	2	2	2	1	3
C703.6	3	3	2	2	1	1	1	1	2	2	1	3
Avg	**3.0**	**3.0**	**2.0**	**1.8**	**1.0**	**1.2**	**1.2**	**1.2**	**2.0**	**2.0**	**1.0**	**3.0**
Roundup	**3.0**	**3.0**	**2.0**	**2.0**	**1.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**1.0**	**3.0**

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C703.1	3	3	2	1
C703.2	3	3	2	1
C703.3	3	3	2	1
C703.4	3	3	2	1
C703.5	3	3	2	1
C703.6	3	3	2	1
Avg	**3.0**	**3.0**	**2.0**	**1.0**
Roundup	**3**	**3**	**2**	**1**

Signature with Date

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Rana manoj mourya
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Automobile engineering
Subject Code	ME- 704
COURSE OUTCOMES, CO	
C704.1	Optimize the vehicle body design and frame structure for the safety of vehicle.

C704.2	Apply the principle of wheel alignment and balancing the estability of the vehicle
C704.3	Distingush transmission system used in various automobiles and estimate application of slip.
C704.4	Implement the concept of suspension in application of dampers and springs in vehicles.
C704.5	Identifiy the appropriate braking and suspension system in particular automobiles.
C704.6	Analyse the emission system of an Automobile.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C704.1	3	2	2	2	1	2	2	2	1	1	2	2
C704.2	3	2	2	2	1	2	2	1	2	2	2	1
C704.3	2	3	2	2	3	2	2	1	2	2	1	2
C704.4	2	1	3	1	2	2	3	1	3	2	2	2
C704.5	2	2	3	2	3	2	2	3	2	3	2	3
C704.6	3	2	3	2	3	3	1	3	3	3	2	2
Avg	2.5	2.4	2.5	1.9	2.5	2.2	2	1.9	2.2	2.2	2.2	2
Round up	3	3	3	2	3	3	2	2	3	3	3	2

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C704.1	3	3	2	3
C704.2	2	2	1	1
C704.3	3	3	3	1
C704.4	2	2	1	2
C704.5	2	2	3	2
C704.6	2	1	2	2
Avg	2.4	2.2	2.0	1.9
Round up	3.0	3.0	2.0	2.0

Signature with Date

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Manish Baweja
Name of the Programme	B.E in Mechanical Engineering
Subject Name	OR & supply chain
Subject Code	ME- 705

COURSE OUTCOMES, CO

The students will be able to	
C705.1	Apply linear system and distribution models being used in linear programming for two variables and apply special cases of transportation &assignment.
C705.2	Apply Supply Chain management and optimization techniques in industry
C705.3	Apply Knowledge of Inventory models. MRP techniques and E-business
C705.4	Analyse Queue line models and competitive strategy for solution of game theory problems.
C705.5	Analyse decision, risk probability and uncertainty.
C705.6	Analyse linear system and distribution models, supply chain management techniques and inventory models.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C705.1	3	3	1	2	1	1	1	3	3	1	2	1
C705.2	2	2	1	3	2	3	3	2	3	2	3	2
C705.3	3	3	2	2	2	3	2	2	3	3	3	2
C705.4	2	3	2	2	3	2	2	2	2	2	2	2
C705.5	3	3	1	3	2	2	3	3	3	1	3	2
C705.6	3	3	2	3	2	3	2	2	3	2	3	3
Avg	2.67	2.83	1.5	2.5	2	2.33	2.17	2.33	2.83	1.83	2.67	2
Round Up	3.0	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	2.0	3.0	3.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C705.1	3	3	1	2
C705.2	2	3	2	2
C705.3	2	2	2	3
C705.4	3	2	1	2
C705.5	2	3	1	3
C705.6	3	3	2	3
Avg	2.5	2.7	1.5	2.5
Round Up	3.0	3.0	2.0	3.0

Signature with Date

Lakshmi Narain College of Technology

Department of Mechanical Engineering

Name of course coordinator	Dr.Yogesh Dewang
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Minor Project
Subject Code	ME- 706
COURSE OUTCOMES, CO	
C706.1	Apply knowledge of mechanical engineering subjects in handling engineering projects.
C706.2	Apply appropriate tools and technique in modelling of complex mechanical engineering problems.
C706.3	Incorporate the environmental, safety and health considerations in solving problems.
C706.4	Perform effectively as an individual or leader of a team in execution of engineering project.
C706.5	Apply communication skills in the form of preparing reports and presentation.
C706.6	Devise product to fulfill the technological needs of the society or industry with consideration of professional norms.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C706.1	3	3	2	3	3	2	3	2	2	3	3	3
C706.2	3	3	3	3	3	1	2	1	2	3	2	3
C706.3	2	1	2	2	2	3	3	2	2	2	2	2
C706.4	3	3	3	3	3	2	2	2	3	3	3	2
C706.5	3	3	2	3	3	2	1	1	2	3	3	3
C706.6	3	3	3	3	3	2	2	2	3	3	3	2
Avg	2.8	2.7	2.5	2.8	2.8	2.0	2.2	1.7	2.3	2.8	2.7	2.5
Roundup	3	3	3	3	3	2	3	2	3	3	3	3

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C706.1	3	2	3	3
C706.2	2	3	3	2
C706.3	2	3	2	1
C706.4	3	1	3	3
C706.5	3	3	3	2
C706.6	3	3	2	2
Avg	2.7	2.5	2.7	2.2
Roundup	3	3	3	3

Signature with Date

Lakshmi Narain College of Technology												
Department of Mechanical Engineering												
Name of course coordinator	Dr.Yogesh Dewang											
Name of the Programme	B.E in Mechanical Engineering											
Subject Name	Industrial Training											
Subject Code	ME- 707											
COURSE OUTCOMES, CO												
C707.1	Apply knowledge of mechanical engineering to formulate and development of solutions of industrial oriented problems.											
C707.2	Apply practical approach for solution of industrial problems.											
C707.3	Write report and also able to communicate outcomes of important findings in appropriate forms.											
C707.4	Perform activities in an engineering task both as individual and team member.											
C707.5	Recognize the sources of hazards in industrial activities and provide possible remedial solutions.											
C706.6	Conduct engineering activities in accordance with ethics and norms of engineering practice for sustainable development of society.											
CO-PO Matrix												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C707.1	3	3	3	2	3	2	3	2	2	2	3	3
C707.2	3	3	2	3	3	2	3	2	3	3	2	3
C707.3	1	2	2	1	1	1	2	2	3	3	1	2
C707.4	3	2	1	1	2	2	1	3	3	3	1	3
C707.5	2	2	1	3	2	2	3	2	2	3	1	2
C706.6	3	2	1	3	3	3	3	3	3	2	2	3
Avg	2.5	2.3	1.7	2.2	2.3	2.0	2.5	2.3	2.7	2.7	1.7	2.7
Roundup	3	3	2	3	3	2	3	3	3	3	2	3

CO-PSO Matrix				
CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C707.1	3	2	3	3
C707.2	2	3	3	3
C707.3	2	2	3	1
C707.4	3	1	2	3
C707.5	3	3	1	2
C706.6	1	3	3	3
Avg	2.3	2.3	2.5	2.5
Roundup	3	3	3	3

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Dr. Vipin Shrivastava
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Energy Management & Audit
Subject Code	ME -801
COURSE OUTCOMES, CO	

The student will be able to

C801.1	Apply concepts of energy management in various sectors of energy use.
C801.2	Perform energy audit and prepare report
C801.3	Use the methods for preparing material energy balance and energy action plan.
C801.4	Apply the energy management concepts in electrical utilities.
C801.5	Apply concepts of energy conservation in thermal utilities used in plants.
C801.6	Perform energy audit for setting up effective energy management system in industry

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
CO801.1	3	2	2	3	2	3	3	3	3	3	2	1
CO801.2	2	2	2	2	2	3	3	3	3	3	2	1
CO801.3	1	1	3	2	1	2	1	3	1	2	2	1
CO801.4	2	2	2	1	2	2	2	3	1	2	2	1
CO801.5	2	2	2	1	2	2	2	3	2	2	2	2
CO801.6	3	2	2	1	2	3	3	3	3	3	2	2
Avg	2.1	1.8	2.1	1.6	1.8	2.5	2.3	3	2.1	2.5	2	1.3
Round up	3	2	3	2	2	3	3	3	3	3	2	2

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C801.1	3	2	3	3
C801.2	3	2	3	3

C801.3	1	1	2	2
C801.4	3	2	2	2
C801.5	3	2	2	2
C801.6	2	2	2	2
Avg	2.5	1.8	2.3	2.3
Round up	3.0	2.0	3.0	3.0

Signature with Date

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Dr. Shailendra Dwivedi
Name of the Programme	B.E in Mechanical Engineering
Subject Name	MACHINE DESIGN
Subject Code	ME- 802
COURSE OUTCOMES, CO	

The student will be able to

C802.1	Design the belt,chain and rope drives for given application
C802.2	Implement the design procedure for a gear drive for required velocity ratio.
C802.3	Calculate the forces acting on the I.C. Engine parts.
C802.4	Estimate the cost of designing, material selection for simple machine elements.
C802.5	Develope the optimized design of an engineering application.
C802.6	Apply the designing procedure in assembly design and spare part replacement in case of worn out machine element.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C802.1	3	3	2	1	1	1	1	1	1	2	1	3
C802.2	3	3	2	1	1	2	2	1	1	2	1	3
C802.3	3	3	3	1	2	2	2	1	1	2	1	3
C802.4	3	3	3	2	2	2	2	2	1	2	1	3
C802.5	3	3	2	1	2	1	1	1	1	2	1	3
C802.6	3	3	2	2	2	2	2	1	1	2	1	3
Avg	3.0	3.0	2.3	1.3	1.7	1.7	1.7	1.2	1.0	2.0	1.0	3.0

Roud-up	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	1.0	3.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C802.1	3	3	2	3
C802.2	2	2	2	2
C802.3	3	3	2	3
C802.4	2	2	3	2
C802.5	2	3	2	3
C802.6	3	3	3	2
Avg	3.0	3.0	3.0	3.0
Roud-up	3.0	3.0	3.0	3.0

Signature with Date

Lakshmi Narain College of Technology

Department of Mechanical Engineering

Name of course coordinator	Sachin kumar Nikam
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Refrigeration and air conditioing
Subject Code	ME- 803

COURSE OUTCOMES, CO: 803 Refrigeration and Air-Conditioing

The student will be able to

C803.1	Apply the basic concepts of refrigeration and thermodyanamic cycle for numeric solution of refrigeration system.
C803.2	Draw the thermodynamics process of vapour compression cycle on p-h and T-S diagrams and use them for solutions of problems.
C803.3	Apply the principles of vapour absorption refrigeration system, steam-jet refrigeration and properties of refrigerants in design and performance estimation of refrigeration system.
C803.4	Draw psychrometric processes using psychrometric properties and solve numeric problem of air conditioining systems.
C803.5	Calculate the load for air conditioning system at various weather conditions.
C803.6	Design and analysis refrigeration and air conditioing system for efficient and safe working.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**

C803.1	2	3	2	2	2	1	1	2	2	2
C803.2	3	2	3	2	2	2	2	2	3	2
C803.3	2	3	2	2	2	2	2	2	2	2
C803.4	3	2	2	2	2	2	2	3	3	3
C803.5	2	2	3	2	3	2	2	3	3	3
C803.6	3	2	2	2	2	3	3	2	3	3
Avg	2.5	2.3	2.3	2.0	2.2	2.0	2.0	2.3	2.7	2.5
Round up	3	3	3	2	3	2	2	3	3	3

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C803.1	2	2	1	2
C803.2	3	2	2	2
C803.3	2	2	2	2
C803.4	2	3	2	2
C803.5	2	2	2	3
C803.6	2	2	3	2
Avg	2.2	2.2	2.0	2.2
Round up	3	3	2	3

Signature with Date

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Anil Chourasia
Name of the Programme	B.E in Mechanical Engineering
Subject Name	CAD/CAM/CIM
Subject Code	ME- 804
COURSE OUTCOMES, CO	
The student will be able to	
C804.1	Apply the concept of computer integrated manufacturing in industrial production.
C804.2	Develop graphical model using basic tools of transformation of geometry.
C804.3	Construct solid geometry the form of two dimensional and three dimensional models using basics of geometric modelling.
C804.4	Apply the principles of numerical control machines and preparation of part program using preparatory and miscellaneous codes.
C804.5	Distinguish batch and job shop production and apply the production flow analysis and computer aided process planning (CAPP) in production

	processes.
C804.6	Apply the principles of CAD, CAM and CIM in industrial environment for optimization of design and processess.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C804.1	3	2	3	2	2	2	1	2	2	3	2	3
C804.2	2	2	3	2	3	2	1	1	2	2	2	3
C804.3	2	2	3	2	2	2	2	2	1	2	2	3
C804.4	2	3	3	2	2	2	2	1	2	2	1	3
C804.5	3	2	3	1	3	2	1	2	2	2	3	3
C804.6	3	3	3	2	2	2	2	2	2	2	2	3
Avg	2.5	2.3	3.0	1.8	2.3	2.0	1.5	1.7	1.8	2.2	2.0	3.0
Roud-up	3.0	3.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
CO1	2	3	2	2
CO2	2	3	1	1
CO3	2	3	2	2
CO4	2	3	1	2
CO5	2	3	2	3
CO6	2	3	2	3
Avg	2.0	3.0	1.7	2.2
Roud-up	3	3	2	3

Signature with Date

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Sandeep Mahore
Name of the Programme	B.E in Mechanical Engineering
Subject Name	MAJOR PROJECT
Subject Code	ME- 805
COURSE OUTCOMES, CO	
The student will be able to	
C805.1	Illustrate the research requirements for technological advancement on the basis of review of previous researches.

C805.2	Develop mathematical model based on scientific principles.
C805.3	Execute the project work as a team member and team leader as well.
C805.4	Plan and manage activities of a project work for cost effective and timely completion of work.
C805.5	Practice the professional activities with due consideration of ethics, health, safety and legal issues.
C805.6	Display and communicate results of project work in terms of reports, presentation and documents.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
C805.1	3	3	1	3	3	3	3	2	2	3	1	3
C805.2	3	3	3	3	3	1	3	3	2	3	1	3
C805.3	3	1	3	3	1	1	1	3	3	2	2	3
C805.4	3	1	2	1	3	2	1	2	3	3	3	3
C805.5	3	1	3	3	3	3	1	3	2	2	3	3
C805.6	3	1	1	1	3	2	2	2	2	3	2	1
Avg	3.0	2.0	3.0	3.0	3.0	2.0	2.0	3.0	3.0	3.0	2.0	3.0

CO-PSO Matrix

CO	PSO1	PSO2	PSO3	PSO4
C805.1	3	2	3	2
C805.2	3	3	3	2
C805.3	3	2	3	3
C805.4	1	2	3	3
C805.5	1	3	2	2
C805.6	1	3	3	2
Avg	2.0	3.0	3.0	3.0

Lakshmi Narain College of Technology	
Department of Mechanical Engineering	
Name of course coordinator	Jitendra Raguwanshi
Name of the Programme	B.E in Mechanical Engineering
Subject Name	Seminar / Group Discussion
Subject Code	ME- 806
COURSE OUTCOMES, CO	

The students will be able to

C806.1	Apply strategies of effective time management.
C806.2	Adapt appropriate strategy of presentation of subject matter.
C806.3	Communicate effectively in professional environment..
C806.4	Acquire ideas from discussion.
C806.5	Challenge ideas of own or ideas of others to arrive at better conclusion.
C806.6	Explore better scope of problem solving and goal attainment.

CO-PO Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**	**P11**	**P12**
C806.1	1	1	2	2	1	1	2	1	3	3	3	2
C806.2	2	2	2	2	2	2	2	1	3	3	3	2
C806.3	1	3	3	2	2	1	1	2	3	3	3	2
C806.4	1	1	2	2	2	1	1	1	3	3	3	1
C806.5	1	2	3	3	3	1	1	1	2	3	3	2
C806.6	2	3	2	2	3	1	1	1	2	3	3	1
Avg	1.3	2.0	2.3	2.2	2.2	1.2	1.3	1.2	2.7	3.0	3.0	1.7
Round up	2.0	2.0	3.0	3.0	3.0	2.0	2.0	2.0	3.0	3.0	3.0	2.0

CO-PSO Matrix

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C806.1	1	1	3	3
C806.2	1	2	3	2
C806.3	2	2	3	3
C806.4	1	1	2	2
C806.5	2	1	3	3
C806.6	1	2	3	2
Avg	1.3	1.5	2.8	2.5
Round up	2.0	2.0	3.0	3.0

Signature with Date

Second Year

BT-104 BEEE

CO1 Analyze and solve DC circuits using various Electric Laws.
CO2 Interpret the sinusoidal electrical quantities and parameters mathematically as well as graphically for 1- phase/3-phase AC circuits.
CO3 Explain construction, working, application and losses of transformer
CO4 Explain the working principle, construction, applications of DC and AC machines.
CO5 Apply the concepts of basic electronics to design various electronic circuits.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	2	1	2	3	2	0	2
CO2	3	3	2	1	2	2	2	2	2	3	0	3
CO3	3	3	2	2	2	3	3	2	3	3	0	3
CO4	3	2	2	1	0	2	2	1	3	2	1	3
CO5	3	1	2	1	0	2	1	0	2	2	2	3

Correlation levels 1, 2 or 3 as defined above: 1: Slight (Low) 2: Moderate (Medium)3: Substantial (High) and "-" if there is no correlation.

PSO-1	Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical/electronics system and networks.
PSO-2	Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical/electronics systems.
PSO-3	analyze, design, and implement control systeminstrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.
PSO-4	Application project management, techniques and computations and to power systems and electrical/ electronics systems.

	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5
CO1	1	2	1	1	0
CO2	3	3	2	1	2
CO3	2	3	3	2	2
CO4	0	1	2	0	1
CO5	0	1	2	0	0

EX 303 Electrical Measurement & Measuring Instruments

COs:

CO-1 Understand basic concept of electrical measuring instruments.
CO-2 Explain types of electrical measuring instruments.
CO-3 Analyze different applications of measuring instrument transformer.
CO-4 Evaluate the performance of energy meter.
CO-5 Select appropriate instrument for measuring electrical parameters.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	3	2	3	1	0	2	2	3
CO2	3	2	2	3	2	2	2	1	0	1	2	2
CO3	3	3	1	2	3	2	1	0	0	2	1	2
CO4	2	3	2	2	3	2	2	0	2	3	1	2
CO5	2	3	1	2	2	2	2	1	2	2	1	2

	PSO1	PSO2	PSO3	PSO4
CO 1	2	3	2	1
CO 2	3	2	1	2
CO 3	1	2	3	1
CO4	2	3	2	1
CO5	1	1	2	2

EX304 Network Analysis

CO 1 Describe the concept of different transient and steady state approaches of AC and DC networks.
CO 2 Apply graph theory techniques for analyzing electrical networks.
CO 3 Apply network theorems in different electrical circuits.
CO 4 Analyze time and frequency concepts of Laplace transform.
CO 5 Evaluate two port parameters of various networks.

CO and PO Mapping

CO↓/PO →	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	2	1	-	-	-	1	1	1	-	-	1
CO 2	2	1	1	1	-	-	1	-	-	-	1	-
CO 3	1	1	2	-	-	1	-	-	-	-	-	-
CO 4	-	1	1	-	1	1	1	-	-	-	-	-
CO 5	1	2	1	1	1	1	1	-	1	-	1	1

CO and PSO Matrix

CO↓/PO→	PSO1	PSO2	PSO3	PSO4
CO 1	3	3	2	1
CO 2	2	1	1	1
CO 3	1	1	-	2
CO 4	2	1	-	1
CO 5	1	-	1	2

EX402 Electrical Machine-I

CO 1 Remember basic features of Electrical Machine.
CO 2 Understand the detailed features including performance of three phase transformer.
CO 3 Illustrate construction and operation of IM.
CO 4 Analyze performance of IM.
CO 5 Evaluate the performance of various rotating single phase machine.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	2	1	1	2	1	2	2	--	3	1
CO 2	3	1	3	2	2	2	2	3	1	2	--	1
CO 3	2	3	2	2	3	2	3	--	2	3	2	--
CO 4	3	--	3	2	--	2	2	1	2	2	1	1
CO 5	2	2	2	--	2	--	2	--	3	3	1	1

	PSO1	PSO2	PSO3	PSO4
CO 1	**3**	**3**	**2**	**1**
CO 2	**2**	**2**	**1**	**1**
CO 3	**1**	**1**	**-**	**2**
CO4	**2**	**1**	**-**	**1**
CO5	**1**	**2**	**1**	**2**

EX404 Power System-I

CO1 An understanding basics of electrical power generations from conventional and non conventional sources of energy.
CO2 To introduce the students to the general structure of the network for transferring power from generating stations to the consumers.
CO3 To expose the students to the different electrical & mechanical aspects of the power network along with its environmental and safety constraints.

CO4 To familiarize the students with the price structure of Indian power market.

CO5 Access overvoltage in transmission system and their control.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	-	-	-	-	3	3	2	-	3	2	3
CO 2	2	2	2	2	3	-	3	2	-	3	2	3
CO 3	-	2	-	-	2	2	2	3	-	2	2	3
CO 4	-	-	2	2	-	-	-	3	-	2		3
CO 5	-	2	-	-	3	2	2	2	-	2	2	2

	PSO1	PSO2	PSO3	PSO4
CO 1	**-**	**3**	**2**	**-**
CO 2	**-**	**2**	**1**	**1**
CO 3	**1**	**1**	**3**	**1**
CO4	**-**	**2**	**1**	**2**
CO5	**-**	**1**	**-**	**-**

EX405 Control System

CO 1: Classify different types of control system.
CO 2: Analyze time response of a control system to various input signals.
CO 3: Examine stability of a control system using time domain analysis methods.
CO 4: Evaluate stability of a control system using time domain analysis methods.
CO 5: Design different compensating networks for a given system.

CO and PO Matrix

CO↓/PO→	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	2	2	1	1	-	1	1	-	-	1
CO 2	2	2	2	2	1	-	-	1	-	1	1	1
CO 3	3	2	2	1	1	-	1	1	1	-	-	1
CO 4	2	2	2	1	1	-	1	1	1	-	1	-
CO 5	2	2	2	1	1	1	1	1	1	-	-	1

CO and PSO Matrix

CO↓/PO→	PSO1	PSO2	PSO3	PSO4
CO 1	2	-	1	-
CO 2	1	1	1	-

CO 3	2	1	1	-
CO 4	2	1	-	-
CO 5	1	1	-	-

Third Year

EX 501 Electrical Machine-II

CO1 Acquire knowledge about the constructional details and principle of operation of alternators and dc machines.

CO2 Acquire knowledge about the working of synchronous machines and dc machines as generators and motors.

CO3 Acquire knowledge about testing and applications of synchronous machines and dc machines.

CO4 Formulate and then analyze the working of electrical machines using mathematical model under loaded and unloaded conditions.

CO5 Acquire knowledge about controlling of synchronous machines and dc machines.

CO-PO Mapping

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	2	2	2	1	1	2	-	-	1	-	1
CO 2	3	2	2	2	1	1	2	-	-	1	-	1
CO 3	3	2	2	2	1	1	2	-	-	1	-	1
CO4	3	2	3	1	1	1	2	-	-	1	-	1
CO5	3	2	2	1	1	1	2	-	-	1	-	1

CO and PSO Matrix

	PSO1	PSO2	PSO3	PSO4
CO 1	3	1	3	1
CO 2	3	2	3	1
CO 3	3	1	3	2
CO4	3	2	3	1
CO5	3	3	2	2

EX 502 Power Electronics

CO 1: Understand characteristics of power semiconductor devices.

CO 2: Demonstrate operation of uncontrolled & controlled rectifiers.

CO 3: Analyze waveforms of DC to AC converter circuits.

CO 4: Distinguish different chopper circuits.
CO 5: Summarize the AC voltage controllers & Cycloconverter.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	1	2	2	2	-	1	1	-	1	2
CO 2	3	3	1	2	2	1	1	-	1	1	1	2
CO 3	2	2	1	2	2	1	1	-	2	1	1	3
CO 4	3	2	2	2	1	1	2	1	1	1	2	2
CO 5	2	2	1	3	1	1	1	2	2	1	2	2

CO and PSO Matrix

	PSO1	PSO2	PSO3	PSO4
CO 1	**3**	**2**	**2**	**2**
CO 2	**3**	**3**	**2**	**-**
CO 3	**3**	**2**	**3**	**-**
CO4	**2**	**3**	**2**	**2**
CO5	**2**	**3**	**2**	**2**

EX 503 Departmental Elective –I Electrical Power Generation & Economy
CO 1: Understand the basic features and laws related to electric power generation.
CO 2: Apply the theory and practices in conventional power generation methods.
CO 3 Analyze the operation, maintenance and working of non conventional power plants.
CO 4: Compare the operation, maintenance and working of conventional and non conventional substations.
CO 5 Investigate the practices of various power plants in reference to economy.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	2	1	1	2	1	2	2	--	3	1
CO 2	3	1	3	2	2	2	2	3	1	2	--	1
CO 3	2	3	2	2	3	2	3	--	2	3	2	--
CO 4	3	--	3	2	--	2	2	1	2	2	1	1
CO 5	2	2	2	--	2	--	2	--	3	3	1	1

CO and PSO Matrix

	PSO1	PSO2	PSO3	PSO4
CO 1	**3**	**3**	**2**	**1**
CO 2	**2**	**2**	**1**	**1**
CO 3	**1**	**1**	**-**	**2**
CO4	**2**	**1**	**-**	**1**
CO5	**1**	**2**	**1**	**2**

EX 504 Open Elective –I (Electromagnetic Theory)

CO 1: Apply vector calculus to understand the behavior of static electric fields.

CO 2: Analyze the behavior of conductors, insulator & dielectrics in electric fields.

CO 3: Comprehend the behavior of static magnetic fields using vector calculus.

CO 4: Understand the nature of time varying fields and derive EM wave equation.

CO 5: Examine the phenomena of wave propagation in different media and its using Maxwell's equations interfaces.

CO and PO Matrix

CO↓/PO→	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	3	3	3	1	1	3	3	-	2
CO 2	3	2	3	2	2	2	2	3	3	2	-	1
CO 3	3	3	2	-	3	3	1	2	2	3	2	2
CO 4	3	2	3	3	2	2	1	1	3	3	3	1
CO 5	3	3	2	2	3	3	2	1	2	3	-	-

CO and PSO Matrix

CO↓/PO→	PSO1	PSO2	PSO3	PSO4
CO 1	2	1	1	1
CO 2	2	-	-	1
CO 3	2	1	1	-
CO 4	2	1	-	1
CO 5	1	1	-	-

Fourth Year

EX-701 Power System Protection

CO 1: Understanding of various abnormal conditions in power system.
CO 2 Interpret protective devices in power system.
CO 3 Analyze the performance of circuit breakers.
CO 4: Compare various conventional relays for protection of power system.
CO 5 Discriminate different types of lightning arrester.

CO-PO Mapping:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	**3**	**2**	**1**	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**1**	**3**
CO 2	**3**	**2**	**1**	**1**	**2**	**3**	**3**	**1**	**1**	**3**	**1**	**3**
CO 3	**3**	**3**	**1**	**2**	**1**	**2**	**1**	**1**	**3**	**2**	**1**	**2**
CO 4	**3**	**3**	**1**	**2**	**1**	**2**	**2**	**--**	**3**	**2**	**1**	**3**
CO 5	**3**	**1**	**--**	**3**	**1**	**3**	**2**	**1**	**3**	**2**	**1**	**3**

CO and PSO Matrix

	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	2	1	1	1
CO 2	1	1	1	1	1
CO 3	2	1	1	2	1
CO4	1	2	2	1	1
CO5	2	1	1	1	1

EX-702 Departmental Elective (High Voltage Engineering)

CO 1: Discus high voltage technology, merits/demerits, limitations and its applications.
CO 2: Explain electrical breakdown phenomena in gases, liquids and solids, related theories for
given fields.
CO 3: Analyze the performance of electronics instruments regarding different input signals.
CO 4: Evaluate the test measurement techniques of high DC, AC and impulse voltage and current.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	1	--	1	2	--	3	1	3	--	1
CO 2	2	2	2	--	2	1	3	2	2	--	2	3
CO 3	1	--	2	1	1	1	--	--	--	2	1	2
CO 4	2	1	1	1	2	3	2	1	--	1	--	--
CO 5	1	3	--	1	--	1	--	1	2	--	3	2

CO and PSO Matrix

	PSO1	PSO2	PSO3	PSO4
CO 1	**3**	**2**	**2**	**1**
CO 2	**2**	**1**	**2**	**3**
CO 3	**1**	**--**	**1**	**--**
CO4	**--**	**1**	**--**	**2**
CO5	**1**	**1**	**1**	**1**

EX-703 Open Elective (Energy Audit & Management)
CO1 Assess the need for energy auditing and energy & power scenario of the world.
CO2 Evaluate the impact of power factor on various electrical systems.
CO3 Compute the efficiency of various thermal systems.
CO4 Apply energy conservation techniques in major utilities.
CO5 Apply Energy Economics in various electrical & mechanical systems.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	1	--	1	2	--	3	1	3	--	1
CO 2	2	2	2	--	2	1	3	2	2	--	2	3
CO 3	3	--	2	1	1	2	--	--	--	2	1	2

CO 4	2	1	1	1	2	3	2	1	--	1	--	--
CO 5	1	3	--	1	--	1	--	1	2	--	3	2

	PSO1	PSO2	PSO3	PSO4
CO 1	3	3	2	1
CO 2	2	2	1	1
CO 3	1	1	-	2
CO 4	2	1	-	1
CO 5	1	2	1	2

CO and PSO Matrix

EX-801 Electrical Drives

CO 1: Investigate the control of DC motors by single/multiple phase converters.
CO 2: Distinguish the operation of DC drives through Choppers.
CO 3 Compare the control of induction motor drives from stator side by various methods.
CO 4: Evaluate control techniques for providing efficient control of induction motor drives from rotor side.
CO 5: Classify the control strategies of synchronous motors by VSI, CSI and cycloconverters.

CO-PO Mapping:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3	3	3	3	2	2	2	--	2	2	2	3
CO 2	3	2	--	--	2	2	2	1	2	2	2	3
CO 3	3	2	2	2	2	2	2	1	2	2	2	3
CO 4	3	2	1	--	2	2	2	--	2	2	2	--
CO 5	3	3	3	2	2	2	2	1	2	2	2	3

CO and PSO Matrix

CO↓/PSO→	PSO1	PSO2	PSO3	PSO4
CO 1	2	3	2	2
CO 2	3	1	1	3
CO 3	2	3	2	2
CO 4	3	3	1	2
CO 5	1	3	3	1

EX-802 Departmental Elective (Power Quality Problems and Mitigation Techniques)

CO 1: Understand the severity of power quality problems in distribution system.
CO 2: Apply the theory and practices that cause power quality problems rectification.
CO 3: Analyze the working and operation of unified power quality compensators.
CO 4: Evaluate the Power Quality problems caused by Voltage sags and interruption.
CO 5 Investigate how to mitigate the different types of Power Quality problems.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	2	1	1	2	1	2	2	-	3	1
CO 2	3	1	3	2	2	2	2	3	1	2	-	1
CO 3	2	3	2	2	3	2	3	-	2	3	2	-
CO 4	3	-	3	2	-	2	2	1	2	2	1	1
CO 5	2	2	2	-	2	-	2	-	3	3	1	1

EX-803 Open Elective (Power Electronics Converters for Renewable Energy)

CO1 Assess the world energy scenario and impact of solar energy on it.
CO2 Explain the power conversion techniques for solar energy.
CO3 Analyze the various triggering techniques for power converters.
CO4 Explain the basics of wind energy systems.
CO5 Analyze the controlling of wind generators.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	1	--	1	2	--	3	1	3	--	1

CO 2	2	2	2	--	2	1	2	2	1	--	2	1
CO 3	3	--	2	1	1	2	--	--	--	2	1	2
CO 4	2	1	1	1	2	2	2	1	--	1	--	--
CO 5	1	3	--	1	--	1	--	1	2	--	3	2

	PSO1	PSO2	PSO3	PSO4
CO 1	3	3	2	1
CO 2	2	2	1	1
CO 3	1	1	-	2
CO 4	2	1	-	1
CO 5	1	2	1	2

Department of Civil Engineering

Second Year

COURSE OUTCOMES for BT-301 Engineering Mathematics-II

Students should be able to

C301.1	Application of effective mathematical tools for the numerical solutions of algebraic
C301.2	To enable technocrats to acqire mathematical knowledge for understanding Laplace
C301.3	Application of Mathematical tools available in statistics needed in engineering
C301.4	Use Partial Differential Equations (Heat & Wave equation) to solve complex engineering flow problems.
C301.5	Understand physical significance of Gradient, Divergence and Curl in complex engineering flow problems.

CO-PO: Mapping for BT-301 Engineering Mathematics-II

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C301.1	3	3	2	1	3	1	1	1	1	1	1	3
C301.2	3	3	2	1	3	1	1	1	1	1	1	3
C301.3	3	3	2	1	3	1	1	1	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C301.1	3	3	1	3
C301.2	3	3	1	3
C301.3	3	3	1	3

OURSE OUTCOMES for Construction Materials CE302

Students should be able to

C302.1	Utilization of various construction materials -stones, bricks mortar and concrete
C302.2	Utilization of various construction materials-Timber, Glass, Steel and Aluminum
C302.3	Application and use of different flooring materials, roofing, plumbing and sanitary materials
C302.4	use of paints, enamels and varnishes in civil construction
C302.5	utilization of various construction materials-Bitumen, tar and asphalt

CO-PO: Mapping for CE-302 Construction Materials

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C302.1	3	2	1	1	1	1	3	1	1	1	1	3
C302.2	3	2	1	1	1	1	3	1	1	1	1	3
C302.3	3	2	1	1	1	1	3	1	1	1	1	3
C302.4	3	2	1	1	1	1	3	1	1	1	1	3
C302.5	3	2	1	1	1	1	3	1	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C302.1	3	3	1	2
C302.2	3	3	1	2
C302.3	3	3	1	2
C302.4	3	3	1	2
C302.5	3	3	1	2

COURSE OUTCOMES for Surveying CE303

Students should be able to

C303.1	Classification and methods of surveying & leveling
C303.2	use of trigonometric leveling & use of the odolite traversing
C303.3	Principles of tachometry and its use in surveying
C303.4	classification and use of cuves
C303.5	Methods of hydrographic surveys and photographic surveying

CO-PO: Mapping for Survying CE303

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C303.1	3	3	3	3	3	1	1	1	1	1	1	2
C303.2	3	3	3	3	3	1	1	1	1	1	1	2
C303.3	3	3	3	3	3	1	1	1	1	1	1	2
C303.4	3	3	3	3	3	1	1	1	1	1	1	2
C303.5	3	3	3	3	3	1	1	1	1	1	1	2

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C303.1	3	3	1	3
C303.2	3	3	1	3
C303.3	3	3	1	3
C303.4	3	3	1	3
C303.5	3	3	1	3

COURSE OUTCOMES for Building Planning & Architecture CE304

Students should be able to

C304.1	drawing of building elements
C304.2	Planning & classification of buildings,
C304.3	making use of different services in building
C304.4	Principles of architectural design
C304.5	Drwing of perspective drawing, town planning including master plan

CO-PO: Mapping for Building Planning & Architecture CE304

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C304.1	3	3	3	3	3	1	1	1	1	3	1	2
C304.2	3	3	3	3	3	1	1	1	1	3	1	2
C304.3	3	3	3	3	3	1	1	1	1	3	1	2
C304.4	3	3	3	3	3	1	1	1	1	3	1	2
C304.5	3	3	3	3	3	1	1	1	1	3	1	2
C304.1	3	3	3	3	3	1	1	1	1	3	1	2

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C304.1	3	3	1	2
C304.2	3	3	1	2
C304.3	3	3	1	2
C304.4	3	3	1	2
C304.5	3	3	1	2

COURSE OUTCOMES for Strength of materials CE305

Students should be able to

C305.1	Analysis of simple stress and strains
C305.2	Analysis of bending and shearing stresses
C305.3	Determination of slope and deflection of beam by different methods
C305.4	Design of column and its classification
C305.5	Analysis of toson of shaft

CO-PO: Mapping for Strength of materials CE305

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C305.1	3	3	3	3	3	1	1	1	1	1	1	2
C305.2	3	3	3	3	3	1	1	1	1	1	1	2
C305.3	3	3	3	3	3	1	1	1	1	1	1	2
C305.4	3	3	3	3	3	1	1	1	1	1	1	2
C305.5	3	3	3	3	3	1	1	1	1	1	1	2

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C305.1	3	3	1	3
C305.2	3	3	1	3
C305.3	3	3	1	3
C305.4	3	3	1	3
C305.5	3	3	1	3

COURSE OUTCOMES for Study of historical & ancient civil engineering practices CE306

Students should be able to

C306.1	General study of ancient monuments
C306.2	evaluation of environmental practices adopted in construction of historical structures
C306.3	evaluation of construction techniques and materials used in historical structures
C306.4	planning of historical structures
C306.5	visit of historical structures and museums to understand history of civil engineering

CO-PO: Mapping for Study of historical & ancient civil engineering practices CE306

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C306.1	3	1	1	1	1	2	3	1	1	1	1	3
C306.2	3	1	1	1	1	2	3	1	1	1	1	3
C306.3	3	1	1	1	1	2	3	1	1	1	1	3
C306.4	3	1	1	1	1	2	3	1	1	1	1	3
C306.5	3	1	1	1	1	2	3	1	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C306.1	3	3	1	1
C306.2	3	3	1	1
C306.3	3	3	1	1
C306.4	3	3	1	1
C306.5	3	3	1	1

COURSE OUTCOMES for Energy & Environment Engineering ES401

Students should be able to

C401.1	Develop an understanding of various sources of fossil fuel sources and energy storage
C401.2	Identify eco-systems and its importance in food chain
C401.3	Develop an understanding of biodiversity and its conservation at various levels
C401.4	understanding causes of environmental pollution, and its control including disaster
C401.5	Appreciation and understanding of sustainable development including various acts

CO-PO: Mapping for Energy & Environment Engineering ES401

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C401.1	3	3	1	1	1	3	3	1	1	1	1	3
C401.2	3	3	1	1	1	3	3	1	1	1	1	3
C401.3	3	2	1	1	1	3	3	1	1	1	1	3
C401.4	3	3	1	1	1	3	3	2	1	1	1	3
C401.5	3	1	1	1	1	3	3	2	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C401.1	3	3	1	2
C401.2	3	3		
C401.3	3	3	1	2
C401.4	3	3	1	2
C401.5	3	3	1	2

COURSE OUTCOMES for CONSTRUCTION TECHNOLOGY CE402

Students should be able to

C402.1	Design features of various type of foundation and their usages
C402.2	Design and construction of various types of form work
C402.3	Develop an understanding of biodiversity and its conservation at various levels
C402.4	understanding causes of environmental pollution, and its control including disaster
C402.5	Appreciation and understanding of sustainable development including various acts

CO-PO: Mapping for CONSTRUCTION TECHNOLOGY CE402

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C402.1	3	3	1	1	1	3	3	1	1	1	1	3
C402.2	3	3	1	1	1	3	3	1	1	1	1	3
C402.3	3	2	1	1	1	3	3	1	1	1	1	3
C402.4	3	3	1	1	1	3	3	2	1	1	1	3
C402.5	3	1	1	1	1	3	3	2	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C402.1	3	3	1	2
C402.2	3	3		
C402.3	3	3	1	2
C402.4	3	3	1	2
C402.5	3	3	1	2

COURSE OUTCOMES for Structural analysis I CE403

Students should be able to

C403.1	Application of virtual work applied to deformable bodies and analysis of pin-jointed frames for static loads
C403.2	Determination of indeterminacy of static and kinematics, analysis of fixed and continuous beams
C403.3	Analysis of beam and frames by slope deflection method
C403.4	Analysis of three hinged arches of different shapes, suspension cable, two hinged
C403.5	Analysis of rolling loads and influence lines for determinate structures

CO-PO: Mapping for Structural analysis I CE403

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C403.1	3	3	3	3	2	1	1	1	1	1	1	2
C403.2	3	3	3	3	2	1	1	1	1	1	1	2
C403.3	3	2	3	3	2	1	1	1	1	1	1	2
C403.4	3	3	3	3	2	1	1	1	1	1	1	2
C403.5	3	1	3	3	2	1	1	1	1	1	1	2

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C403.1	3	3	1	2
C403.2	3	3	1	2
C403.3	3	3	1	2
C403.4	3	3	1	2
C403.5	3	3	1	2

COURSE OUTCOMES for Transportation Engineering CE404

Students should be able to

C404.1	Evaluation of transportation by roads, railways, airways, waterways their
C404.2	geometric design of roads and railway track
C404.3	Investigation and planning of bridge site and various standards for road and railsy
C404.4	Analysis of bridge foundation, construction, and strengthening of bridges
C404.5	Compare methods of construction of tunnels and engineering survey

CO-PO: Mapping for Transportation Engineering CE404

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C404.1	3	3	3	3	2	2	2	1	1	1	1	2
C404.2	3	3	3	3	2	2	2	1	1	1	1	2
C404.3	3	2	3	3	2	2	2	1	1	1	1	2
C404.4	3	3	3	3	2	2	2	1	1	1	1	2
C404.5	3	1	3	3	2	2	2	1	1	1	1	2

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C404.1	3	3	1	2
C404.2	3	3	1	2
C404.3	3	3	1	2
C404.4	3	3	1	2
C404.5	3	3	1	2

COURSE OUTCOMES for Engineering geology& Remote Sensing CE405

Students should be able to

C405.1	Application of engineering geology for engineering projects
C405.2	Analysis and evaluation of properties of minerals
C405.3	Application of structural geology to civil engineering
C405.4	Application of hydro-geology for ground water
C405.5	Evaluating uses of remote sensing for civil engineering applications

CO-PO: Mapping for Engineering geology& Remote Sensing CE405

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C405.1	3	3	3	3	2	2	2	1	1	1	1	2
C405.2	3	3	3	3	2	2	2	1	1	1	1	2
C405.3	3	2	3	3	2	2	2	1	1	1	1	2
C405.4	3	3	3	3	2	2	2	1	1	1	1	2
C405.5	3	1	3	3	2	2	2	1	1	1	1	2

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C405.1	3	3	1	2
C405.2	3	3	1	2
C405.3	3	3	1	2
C405.4	3	3	1	2
C405.5	3	3	1	2

COURSE OUTCOMES for Software Lab(AutoCAD) CE406

Students should be able to

C406.1	understand and make use of commands of AutoCAD
C406.2	Apply various commands of AutoCAD
C406.3	Analyze 3 D modeling with AutoCAD
C406.4	Applying drawing symbols and attributes, layer command
C406.5	Making use of AutoCAD for plan, section and elevation of a 1 BHK house

CO-PO: Mapping for Software Lab(AutoCAD) CE406

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C406.1	3	2	3	3	3	3	1	1	1	1	1	3
C406.2	3	2	3	3	3	3	1	1	1	1	1	3
C406.3	3	2	3	3	3	2	1	1	1	1	1	3
C406.4	3	2	3	3	3	2	1	1	1	1	1	3
C406.5	3	1	3	3	3	3	1	1	1	1	1	3
C406.1	3	2	3	3	3	3	1	1	1	1	1	3

Third Year

COURSE OUTCOMES for Fluid Mechanics I CE501

Students should be able to

C501.1	Analysis of fluid properties and buoyant forces
C501.2	Develop continuity equation for flow and identify different types of flow
C501.3	Measurement of flow and derivation and application of Bernoulli's equation
C501.4	Analyze laminar flow and Stoke's law
C501.5	Dimensional analysis and use of Buckingham pi theorem

CO-PO: Mapping for Fluid Mechanics I CE501

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C501.1	3	3	1	1	1	1	1	1	1	1	1	1
C501.2	3	3	1	1	1	1	1	1	1	1	1	1
C501.3	3	2	1	1	1	1	1	1	1	1	1	1
C501.4	3	3	1	1	1	1	1	2	1	1	1	1
C501.5	3	1	1	1	1	1	1	2	1	1	1	1

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C501.1	3	3	1	2
C501.2	3	3	1	2
C501.3	3	3	1	2
C501.4	3	3	1	2
C501.5	3	3	1	2

COURSE OUTCOMES for Transportation Engineering II CE502

Students should be able to

C502.1	Planning of high way, its principles and cross sectional elements
C502.2	Design of flexible pavement/rigid pavement
C502.3	Construction of low cost roads, drainage, traffic engineering
C502.4	Planning of airport, runway & taxiway
C502.5	Design of lightning system, traffic control and obstructions

CO-PO: Mapping for Transportation Engineering II CE502

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C502.1	3	3	3	2	2	2	1	1	1	1	1	2
C502.2	3	3	3	2	2	2	1	1	1	1	1	2
C502.3	3	2	3	2	2	2	1	1	1	1	1	2
C502.4	3	3	3	2	2	2	1	2	1	1	1	2
C502.5	3	1	3	2	2	2	1	2	1	1	1	2

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C502.1	3	3	1	2
C502.2	3	3	1	2
C502.3	3	3	1	2
C502.4	3	3	1	2
C502.5	3	3	1	2

COURSE OUTCOMES for CE503

Students should be able to

C503.1	Analyze different types of estimate and principles of working out qtys
C503.2	create rate analysis of different items of civil works
C503.3	preparation of detailed estimate of various types of buildings
C503.4	Assessment of factors affecting cost of work and preparation of DPR
C503.5	Preparation of valuation of buildings and rent fixation

CO-PO: Mapping for CE503

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C503.1	3	3	3	2	2	2	1	1	1	1	1	3
C503.2	3	3	3	2	2	2	1	1	1	1	1	3
C503.3	3	2	3	2	2	2	1	1	1	1	1	3
C503.4	3	3	3	2	2	2	1	2	1	1	1	3
C503.5	3	1	3	2	2	2	1	2	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C503.1	3	3	1	2
C503.2	3	3	1	2
C503.3	3	3	1	2
C503.4	3	3	1	2
C503.5	3	3	1	2

COURSE OUTCOMES for Urban & Town Planning CE504

Students should be able to

C504.1	Planning of urban areas into various zones
C504.2	Implementation of planning of urban areas through various agencies
C504.3	Planning of zoning and land use. Building by laws
C504.4	Traffic management and legal issues involved in planning and professional practice
C504.5	Analysis of different type of development plans

CO-PO: Mapping for Urban & Town Planning CE504

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C504.1	3	3	3	2	2	3	3	1	1	1	2	3
C504.2	3	3	3	2	2	3	3	1	1	1	2	3
C504.3	3	2	3	2	2	3	3	1	1	1	2	3
C504.4	3	3	3	2	2	3	3	2	1	1	2	3
C504.5	3	1	3	2	2	3	3	2	1	1	2	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C504.1	3	3	1	2
C504.2	3	3	1	2
C504.3	3	3	1	2
C504.4	3	3	1	2
C504.5	3	3	1	2

COURSE OUTCOMES for Quantity surveying & Costing (Lab) CE505

Students should be able to

C504.1	Preparation of detailed estimate
C504.2	preparation of detailed estimate for services
C504.3	preparation of rate analysis for different items of construction
C504.4	preparation of DPR for engineering projects
C504.5	preparation of estimate for earthwork of road

CO-PO: Mapping for Quantity surveying & Costing (Lab) CE505

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C504.1	3	3	3	2	2	3	3	1	1	1	2	3
C504.2	3	3	3	2	2	3	3	1	1	1	2	3
C504.3	3	2	3	2	2	3	3	1	1	1	2	3
C504.4	3	3	3	2	2	3	3	2	1	1	2	3
C504.5	3	1	3	2	2	3	3	2	1	1	2	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C504.1	3	3	1	3
C504.2	3	3	1	3
C504.3	3	3	1	3
C504.4	3	3	1	3
C504.5	3	3	1	3

COURSE OUTCOMES for Material Testing Lab CE506

Students should be able to

C506.1	Conduct various tests on cement
C506.2	Evaluate fineness modulus of fine aggregate and coarse aggregate
C506.3	mix design by IS code method
C506.4	Slump test for workability of concrete
C506.5	Compressive strength of concrete and also flexural strength of concrete

CO-PO: Mapping Material Testing Lab CE506

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C506.1	3	3	3	2	2	3	3	1	1	1	2	3
C506.2	3	3	3	2	2	3	3	1	1	1	2	3
C506.3	3	2	3	2	2	3	3	1	1	1	2	3
C506.4	3	3	3	2	2	3	3	2	1	1	2	3
C506.5	3	1	3	2	2	3	3	2	1	1	2	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C506.1	3	3	1	3
C506.2	3	3	1	3
C506.3	3	3	1	3
C506.4	3	3	1	3
C506.5	3	3	1	3

COURSE OUTCOMES for Structural Design & Drawing (RCC-1) CE601

Students should be able to

C601.1	Evaluation of various methods of design of structure
C601.2	design of beam
C601.3	Design of slabs
C601.4	Design of column & footings
C601.5	Design of staircase of different types

CO-PO: Mapping for Structural Design & Drawing (RCC-1) CE601

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C601.1	3	3	3	3	2	2	2	1	1	1	1	2
C601.2	3	3	3	3	2	2	2	1	1	1	1	2
C601.3	3	2	3	3	2	2	2	1	1	1	1	2
C601.4	3	3	3	3	2	2	2	1	1	1	1	2
C601.5	3	1	3	3	2	2	2	1	1	1	1	2

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C601.1	3	3	1	3
C601.2	3	3	1	3
C601.3	3	3	1	3
C601.4	3	3	1	3
C601.5	3	3	1	3

COURSE OUTCOMES for Environmental Engineering CE602

Students should be able to

C602.1	Estimation of ground and water resources
C602.2	Analysis of water
C602.3	Application of various methods for water treatment
C602.4	Design of sewer, its construction and maintenance
C602.5	Analysis of waste water and its disposal

CO-PO: Mapping for Environmental Engineering CE602

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C602.1	3	3	3	3	2	2	2	1	1	1	1	2
C602.2	3	3	3	3	2	2	2	1	1	1	1	2
C602.3	3	2	3	3	2	2	2	1	1	1	1	2
C602.4	3	3	3	3	2	2	2	1	1	1	1	2
C602.5	3	1	3	3	2	2	2	1	1	1	1	2

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C602.1	3	3	1	3
C602.2	3	3	1	3
C602.3	3	3	1	3
C602.4	3	3	1	3
C602.5	3	3	1	3

COURSE OUTCOMES for Water Resource Engineering CE603

Students should be able to

C603.1	Estimate of irrigation water requirement for various crops
C603.2	utilization of ground water for irrigation, advantages and disadvantages
C603.3	Evaluate hydrological cycle including rain gauges and their application for collection
C603.4	construction of canal and other hydraulic structures
C603.5	Probability and frequency analysis for flood, flood control measures and its

CO-PO: Mapping for Water Recourse Engineering

C603.1	3	3	3	3	2	2	2	1	1	1	1	2
C603.2	3	3	3	3	2	2	2	1	1	1	1	2
C603.3	3	2	3	3	2	2	2	1	1	1	1	2
C603.4	3	3	3	3	2	2	2	1	1	1	1	2
C603.5	3	1	3	3	2	2	2	1	1	1	1	2
C603.1	3	3	3	3	2	2	2	1	1	1	1	2

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C603.1	3	3	1	3
C603.2	3	3	1	3
C603.3	3	3	1	3
C603.4	3	3	1	3
C603.5	3	3	1	3

COURSE OUTCOMES for Environmental Impact Assessment CE604

Students should be able to

C604.1	Utility and scope and application of EIA
C604.2	Evaluation of methods for EIA
C604.3	Assessment of impact on air, water, noise and socio-economic environment
C604.4	Organization and planning of information and documentation
C604.5	evaluation of public participation in environmental decision making

CO-PO: Mapping for Environmental Impact Assessment CE604

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C604.1	3	3	3	3	2	3	2	1	1	1	1	3
C604.2	3	3	3	3	2	3	2	1	1	1	1	3
C604.3	3	2	3	3	2	3	2	1	1	1	1	3
C604.4	3	3	3	3	2	3	2	1	1	2	2	3
C604.5	3	1	3	3	2	3	2	1	3	2	2	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C604.1	3	3	1	2
C604.2	3	3	1	2
C604.3	3	3	1	2
C604.4	3	3	1	2
C604.5	3	3	1	2

COURSE OUTCOMES for Advance surveying lab CE605

Students should be able to

C605.1	utilize cross staff and chain for locating various objects
C605.2	Make use of compass for finding bearing of sides of traverse
C605.3	Make use of dumpy level for determination of elevation of various points
C605.4	make use of the odolite for finding vertical angle and for traversing
C605.5	make use of total station for survey

CO-PO: Mapping for Advance surveying lab CE605

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C605.1	3	3	3	3	3	1	1	1	1	1	1	2
C605.2	3	3	3	3	3	1	1	1	1	1	1	2
C605.3	3	2	3	3	3	1	1	1	1	1	1	2
C605.4	3	3	3	3	3	1	1	1	1	1	2	2
C605.5	3	1	3	3	3	1	1	1	3	1	2	2

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C605.1	3	3	1	2
C605.2	3	3	1	2
C605.3	3	3	1	2
C605.4	3	3	1	2
C605.5	3	3	1	2

COURSE OUTCOMES for Non-destructive testing Lab CE606

Students should be able to

C606.1	Making use of rebound hammer test
C606.2	making use of UPV Test

CO-PO: Mapping for Non-destructive testing Lab CE606

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C606.1	3	3	3	3	3	2	2	1	1	1	1	3
C606.2	3	3	3	3	3	2	2	1	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C606.1	3	3	1	2
C606.2	3	3	1	2

Fourth Year

COURSE OUTCOMES for Geotechnical engineering CE701

Students should be able to

C701.1	Classification of soils and determination of index properties
C701.2	Analysis of permeability, construction of flow nets
C701.3	analysis of stress distribution in soil and use of compaction in construction
C701.4	Classification of consolidation and its application in geotechnical engineering
C701.5	analysis and determination of shear strength of soil and stabilization of soils

CO-PO: Mapping for Geotechnical Engineering CE 701

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C701.1	3	3	3	3	2	1	1	1	1	1	1	3
C701.2	3	3	3	3	2	1	1	1	1	1	1	3
C701.3	3	3	3	3	2	1	1	1	1	1	1	3
C701.4	3	3	3	3	2	1	1	1	1	1	1	3
C701.5	3	3	3	3	2	1	1	1	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C701.1	3	3	1	3
C701.2	3	3	1	3
C701.3	3	3	1	3
C701.4	3	3	1	3
C701.5	3	3	1	3

COURSE OUTCOMES for Environmental Engineering II CE702 (B)

Students should be able to

C702.1	Design and theory of preliminary treatment such as screeds, grit chamber,
C702.2	Application of biological treatment for waste water treatment
C702.3	Application of advanced techniques for waste water treatment
C702.4	Classification and characteristics of air pollution
C702.5	Analysis of air pollution chemistry and its model

CO-PO: Mapping for Environmental Engineering II CE702 (B)

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C702.1	3	3	3	3	2	3	3	1	1	1	1	3
C702.2	3	3	3	3	2	3	3	1	1	1	1	3
C702.3	3	3	3	3	2	3	3	1	1	1	1	3
C702.4	3	3	3	3	2	3	3	1	1	1	1	3
C702.5	3	3	3	3	2	3	3	1	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C702.1	3	3	1	3
C702.2	3	3	1	3
C702.3	3	3	1	3
C702.4	3	3	1	3
C702.5	3	3	1	3

COURSE OUTCOMES for Integrated Waste Management CE703(C)

Students should be able to

C703.1	Analysis of physical, chemical and biological characteristics f solid waste
C703.2	Application of principles of waste management
C703.3	Application of concept of transfer station for material segregation
C703.4	Processing and transformation of solid waste
C703.5	Classifification and design of landfills

CO-PO: Mapping for Integrated Waste Management CE703(C)

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C703.1	3	3	3	3	2	3	3	1	1	1	1	3
C703.2	3	3	3	3	2	3	3	1	1	1	1	3
C703.3	3	3	3	3	2	3	3	1	1	1	1	3
C703.4	3	3	3	3	2	3	3	1	1	1	1	3
C703.5	3	3	3	3	2	3	3	1	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C703.1	3	3	1	3
C703.2	3	3	1	3
C703.3	3	3	1	3
C703.4	3	3	1	3
C703.5	3	3	1	3

COURSE OUTCOMES for Prestressed concrete structure Lab CE704

Students should be able to

CO706.1	Perform functional requirement analysis of respective problem domain.
CO706.2	Design ER Diagram and DFD of proposed project work.
CO706.3	Utilize modern techniques and tools necessary for project work.
CO706.4	Write their project work and conclusions.
CO706.5	Illustrate their project work through formal presentation.
CO706.6	Make a formal presentation of their project work and conclusions.

CO-PO: Mapping for Prestressed concrete structure Lab CE704

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C704.1	3	3	3	3	2	1	1	1	1	1	1	3
C704.2	3	3	3	3	2	1	1	1	1	1	1	3
C704.3	3	3	3	3	2	1	1	1	1	1	1	3
C704.4	3	3	3	3	2	1	1	1	1	1	1	3
C704.5	3	3	3	3	2	1	1	1	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C704.1	3	3	1	2
C704.2	3	3	1	2
C704.3	3	3	1	2
C704.4	3	3	1	2
C704.5	3	3	1	2

COURSE OUTCOMES for IOT LAB CE705

Students should be able to

C705.1	Study and install IDE of Arduino and different types of Arduino
C705.2	Write program using Arduino for blink LED
C705.3	Study the temperature sensor and write program for monitor temperature using
C705.4	Study and implement RFID, NFC using Arduino.
C705.5	Study and implement different protocol using Arduino.

CO-PO: Mapping for IOT LAB CE705

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C705.1	3	3	3	3	2	1	1	1	1	1	1	3
C705.2	3	3	3	3	2	1	1	1	1	1	1	3
C705.3	3	3	3	3	2	1	1	1	1	1	1	3
C705.4	3	3	3	3	2	1	1	1	1	1	1	3
C705.5	3	3	3	3	2	1	1	1	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C705.1	3	3	1	2
C705.2	3	3	1	2
C705.3	3	3	1	2
C705.4	3	3	1	2
C705.5	3	3	1	2

COURSE OUTCOMES for Major Project I CE706

Students should be able to

C706.1	Develop skills and knowledge of students to solve technical problem
C706.2	Identify and describe the problem and scope of project
C706.3	Collect, analyze, present data into meaningful information using moder tools
C706.4	Plan, select and execute methodology for solving technical problem
C706.5	Present the rsults in written and oral format eeffectively Present the results in written and oral format eeffectively effectively Present the rsults in written and oral format effectively

CO-PO: Mapping for Major Project I CE706

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C706.1	3	3	3	3	3	2	1	1	2	2	1	3
C706.2	3	3	3	3	3	2	1	1	2	2	1	3
C706.3	3	3	3	3	3	2	1	1	2	2	1	3
C706.4	3	3	3	3	3	2	1	1	2	2	1	3
C706.5	3	3	3	3	3	2	1	1	2	2	1	3

COURSE OUTCOMES for Design of steel structure CE801

Students should be able to

C801.1	Analysis of various types of connections and use of limit state method for design
C801.2	Design of compression and tension members
C801.3	design of flexural members
C801.4	Design of column and column bases
C801.5	Design of industrial buildings
C801.1	Analysis of various types of connections and use of limit state method for design

CO-PO: Mapping for Design of steel structure CE801

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C801.1	3	3	3	3	2	1	1	1	1	1	1	3
C801.2	3	3	3	3	2	1	1	1	1	1	1	3
C801.3	3	3	3	3	2	1	1	1	1	1	1	3
C801.4	3	3	3	3	2	1	1	1	1	1	1	3
C801.5	3	3	3	3	2	1	1	1	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C801.1	3	3	1	3
C801.2	3	3	1	3
C801.3	3	3	1	3
C801.4	3	3	1	3
C801.5	3	3	1	3

COURSE OUTCOMES for Foundation Engineering CE 802(B)

Students should be able to

C802.1	Selection of foundation and sub-soil exploration/investigation
C802.2	Analysis and Design of shallow foundation using various theories
C802.3	Analysis and design of pile and pile group
C802.4	Analysis of foundation on problematic soil & use of geosynthetics in geotechnical
C802.5	Analysis of earth pressure and their theories

CO-PSO Mapping for Foundation Engineering CE 802(B)

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C802.1	3	3	3	3	2	1	1	1	1	1	1	3
C802.2	3	3	3	3	2	1	1	1	1	1	1	3
C802.3	3	3	3	3	2	1	1	1	1	1	1	3
C802.4	3	3	3	3	2	1	1	1	1	1	1	3
C802.5	3	3	3	3	2	1	1	1	1	1	1	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C802.1	3	3	1	3
C802.2	3	3	1	3
C802.3	3	3	1	3
C802.4	3	3	1	3
C802.5	3	3	1	3

COURSE OUTCOMES for Earthquake resistant structure lab CE804

Students should be able to

C804.1	Application of recommendations for making earthquake resistant structure
C804.2	Application of base isolation techniques and dampers for earthquake resistant
C804.3	Application of provisions of IS codes for making earthquake resistant structure

CO-PO: Mapping for Earthquake resistant structure lab CE804

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C804.1	3	3	3	3	3	3	3	1	1	1	2	3
C804.2	3	3	3	3	3	3	3	1	1	1	2	3
C804.3	3	3	3	3	3	3	3	1	1	1	2	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C803.1	3	3	1	3
C803.2	3	3	1	3
C803.3	3	3	1	3

COURSE OUTCOMES for Integrated water management CE803 (D)
Students should be able

C803.1	Application of water management with global and national perspectives
C803.2	Plan and develop frame work for sustainable water resource management
C803.3	Use of modern principles in water management and planning
C803.4	Develop surface and sub-surface water systems along with water balance operation
C803.5	Evaluate conventional and non-conventional techniques for water security

CO-PO: Mapping for Integrated water management CE803 (D)

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C803.1	3	3	3	3	2	3	3	1	1	1	2	3
C803.2	3	3	3	3	2	3	3	1	1	1	2	3
C803.3	3	3	3	3	2	3	3	1	1	1	2	3
C803.4	3	3	3	3	2	3	3	1	1	1	2	3
C803.5	3	3	3	3	2	3	3	1	1	1	2	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C803.1	3	3	1	3
C803.2	3	3	1	3
C803.3	3	3	1	3
C803.4	3	3	1	3
C803.5	3	3	1	3

COURSE OUTCOMES for Major Project II CE805

Students should be able to

C805.1	Undertake problem identification, formulation and solution
C805.2	demonstrate a sound technical knowledge of the selected topic
C805.3	develop communication skills through written and oral presentation
C805.4	to investigate problem in depth and undertake literature survey in this regard
C805.5	design of engineering solution to the problem

CO-PO: Mapping for Major Project II CE805

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C805.1	3	3	3	3	2	2	1	1	2	2	2	3
C805.2	3	3	3	3	2	2	1	1	2	2	2	3
C805.3	3	3	3	3	2	2	1	1	2	2	2	3
C805.4	3	3	3	3	2	2	1	1	2	2	2	3
C805.5	3	3	3	3	2	2	1	1	2	2	2	3

CO/PSO Matrix				
CO/PSO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
C805.1	3	3	2	3
C805.2	3	3	2	3
C805.3	3	3	2	3
C805.4	3	3	2	3
C805.5	3	3	2	3

PG Courses

Department of Electrical and Electronics Engineering

LAKSHMI NARAIN COLLEGE OF TECHNOLOGY EXCELLENCE, BHOPAL

Department of Electrical and Electronics Engineering

POs, PSOs, PEOs, COs, COURSE OBJECTIVES, CO-PSOs & CO-POs MAPPING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Advanced Mathematics**						
COURSE CODE:	**MEPS-101**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN. :	**10**
	PRACTICAL SLOT:	END SEM.:		TERM WORK:			
	TOTAL MARKS:	**100**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**		PRACTICAL:	
TOTAL CREDITS EARNED:	**4**						
COURSE COORDINATOR:							

COURSE CONTENT:

UNIT 1: Solution of Partial Differential Equation (PDE) by separation of variable method, numerical solution of PDE (Laplace, Poisson's, Parabola) using finite difference methods, Elementary properties of FT, DFT, WFT, Wavelet transform, Haar transform.

UNIT 2: Probability, compound probability and discrete random variable. Binomial, Normal and Poisson's distributions, Sampling distribution, elementary concept of estimation and theory of hypothesis, recurred relations.

UNIT 3: Stochastic process, Markov process transition probability transition probability matrix, just and higher order Markov process, Markov chain. Queuing system, transient and steady state, traffic intensity, distribution queuing system, concepts of queuing models (M/M/1: Infinity/ Infinity/ FC FS), (M/M/1: N/ Infinity/ FC FS), (M/M/S: Infinity/ Infinity/ FC FS)

UNIT 4: Operations of fuzzy sets, fuzzy arithmetic & relations, fuzzy relation equations, fuzzy logics. MATLAB introduction, programming in MATLAB scripts, functions and their application.

UNIT 5: Introduction and definition of reliability, derivation of reliability functions, Failure rate, Hazard rate, mean time t future & their relations, concepts of fault tolerant analysis, Elementary idea about decision theory and goal programming.

REFERENCES:

1 **Higher Engineering Mathematics by B.V. Ramana, Tata Mc Hill.**

2 **Advance Engineering Mathematics by Ervin Kreszig, Wiley Easten Edd.**

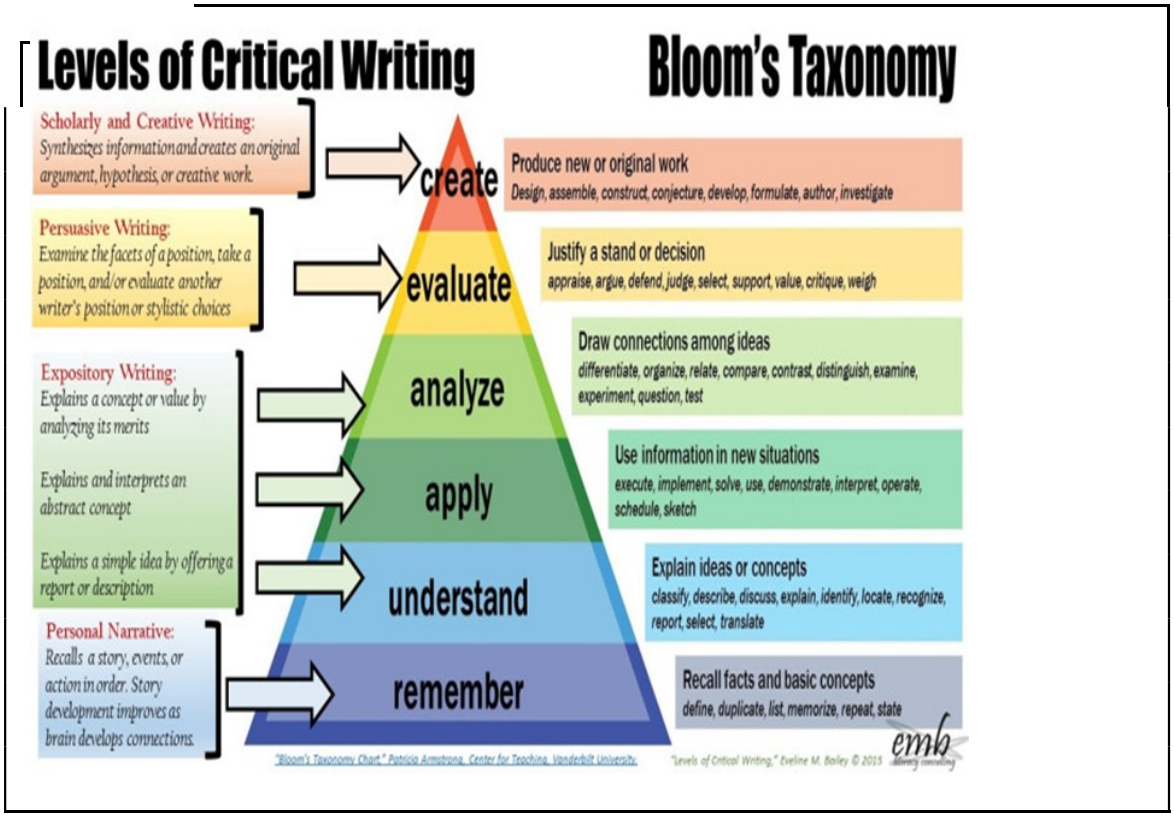
3 **Applied Numerical Methods with MATLAB by Steven C Chapra, TMH.**

4 **Introductory Methods of Numerical Analysis by S.S. Shastry,**

5 **Numerical Solution of Differential Equation by M. K. Jain**

6 **Numerical Mathematical Analysis By James B. Scarborogh**

7 **Fourier Transforms by J. N. Sheddon**



COURSE OUTCOMES (COs) OF ADVANCED MATHEMATICS (MEPS-101)

After a successful completion of the course, students will be able to:

CO	**MEPS101.1**	**Remember** the method to solve basic engineering models through partial differential equations such as wave equation, heat conduction equation etc.
CO	**MEPS101.2**	**Describe** the problems of probability and able to solve them. Learn about binomial, Poison and normal distributions and their applications in different engineering and science fields etc
CO	**MEPS101.3**	**Execute** the fundamental concepts of stochastic analysis and probability theory and its position in modern statistical and mathematical sciences and applied contexts.

CO	**MEPS101.4**	**Analyse** the concepts of fuzzy sets and analysis of statistical data by using fuzzy logic methods. Able to use MATLAB for interactive computations.
CO	**MEPS101.5**	**Assess** the concepts of reliability, various methods of reliability analysis and their applications.

PROGRAMME OUTCOMES (POs):

PO-1	Engineering Knowledge:	*Apply the knowledge or mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*
PO-2	Problem Analysis:	*Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principes of mathematics, natural sciences and engineering sciences.*
PO-3	Design / development of solutions:	*Design solutions for complex engineering problems and design system components or processes to meet the specifies needs with appropriate consideration for the public health and safety and the cultural , societal and environmental consideration.*
PO-4	Conduct investigations of complex problems:	*Use research based knowledge and research method including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
PO-5	Modern tools usage:	*create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitaions.*
PO-6	The engineer and society	*Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues and the consequent responsibilites relevant to the professional engineering practice.*
PO-7	Environment and sustainability:	*Understand the impact of the professional engineering solutions in societal an d environmental context and demonstrate the knowledge of and need for sustainable development.*
PO-8	Ethics:	*Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
PO-9	Individual and team work:	*Function effectively as an indicidual and as a member or leader in diverse teams and in multidisciplinary settings.*
PO-10	Communication:	*Communicate effectively on complex engineering activites with the engineering community and with society at large as, being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.*
PO-11	Project management and finance:	*Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
PO-12	Life-long learning:	*Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical power system.*
PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical power systems.*
PSO-3	*analyze, design, and implement control system instrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*
PSO-4	*Application project management, techniques and computations and to electrical power systems.*

MAPPING BETWEEN COs & POs

		PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PO-11**	**PO-12**
CO	**MEPS101.1**	2	3	1	3	1	1	0	0	2	1	1	2
CO	**MEPS101.2**	2	2	1	3	1	1	1	1	2	1	2	2
CO	**MEPS101.3**	3	3	2	2	1	2	1	1	2	1	2	2
CO	**MEPS101.4**	3	3	3	2	1	2	2	2	2	1	2	3
CO	**MEPS101.5**	2	3	2	2	1	2	1	1	2	0	2	2
TOTAL		12	14	9	12	5	8	5	5	10	4	9	11
AVERAGE		2.4	2.8	1.8	2.4	1	1.6	1	1	2	0.8	1.8	2.2
ROUND UP AVG		3	3	2	3	1	2	1	1	2	1	2	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **104** OUT OF 180 OR **##**

MAPPING BETWEEN COs & PSOs

		PSO-1	**PSO-2**	**PSO-3**	**PSO-4**
CO	**MEPS101.1**	3	2	0	1

CO	**MEPS101.2**	2	2	2	1
CO	**MEPS101.3**	3	2	2	1
CO	**MEPS101.4**	2	2	1	2
CO	**MEPS101.5**	2	1	1	2
TOTAL		12	9	6	7
AVERAGE		2.4	1.8	1.2	1.4
ROUND UP AVG		3	2	2	2

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **34** OUT OF 60 OR **##**

LAKSHMI NARAIN COLLEGE OF TECHNOLOGY EXCELLENCE, BHOPAL

Department of Electrical and Electronics Engineering

POs, PSOs, PEOs, COs, COURSE OBJECTIVES, CO-PSOs & CO-POs MAPPING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Power System Dynamics Analysis and control**						
COURSE CODE:	**MEPS-102**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN. :	**10**
	PRACTICAL SLOT:	END SEM.:		TERM WORK:			
	TOTAL MARKS:	**###**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**	PRACTICAL:		
TOTAL CREDITS EARNED:	**4**						
COURSE COORDINATOR:							

COURSE CONTENT:

UNIT 1: INTRODUCTION TO POWER SYSTEM STABILITY PROBLEM: Basic concepts and definitions: Rotor angle stability, voltage stability and voltage collapse, Midterm and long-term stability, Classification of stability, states of operation and system security system dynamic problems.

UNIT 2: REVIEW OF CLASSICAL METHOD: System model, some mathematical analysis of steady state stability, analysis of transient stability, simplified representation of excitation control.

UNIT 3: MODELING OF SYNCHRONOUS MACHINE: Introduction, synchronous machine, parks transformation, analysis of steady state performance per unit equivalent circuits of synchronous machine, determination of parameters of equivalent circuits, measurements for obtaining data, saturation models, transient analysis of a synchronous machine.

UNIT 4: EXCITATION AND PRIME MOVER CONTROLLERS: Excitation system Modeling, system representation by state evasions, prime move control systems.

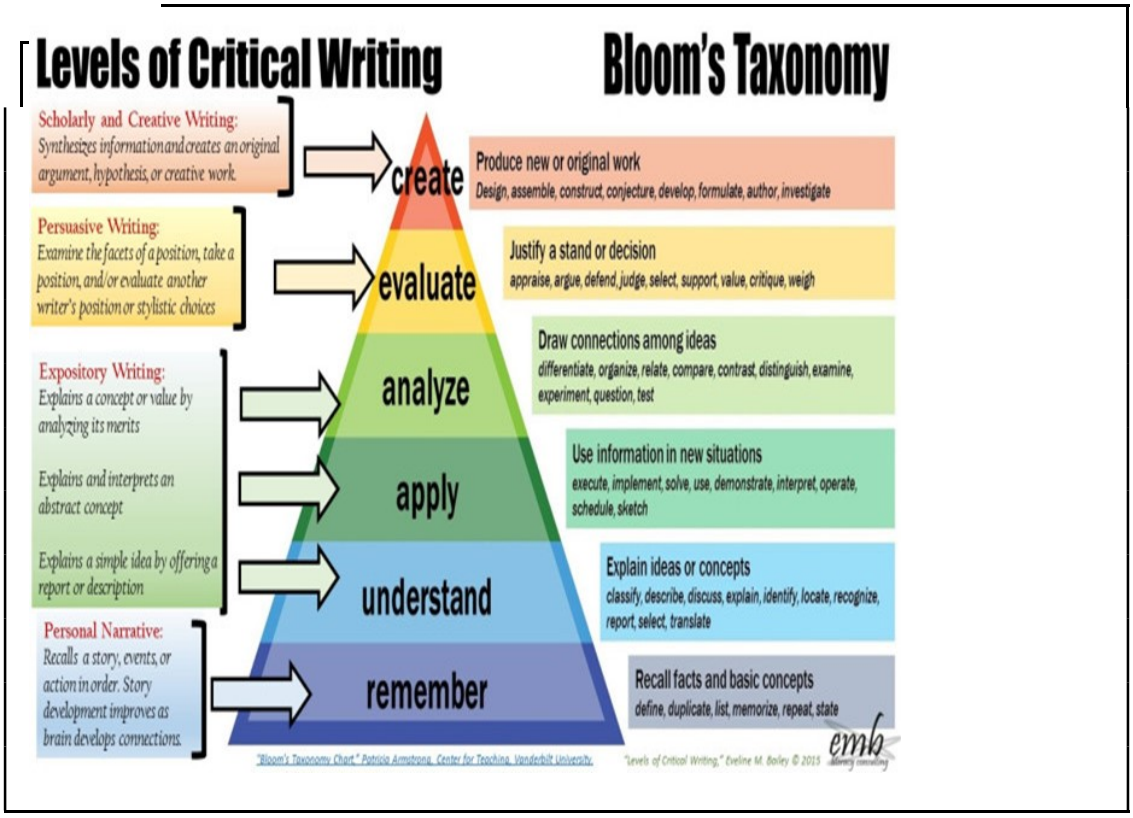
UNIT 5: TRNMISSION LINE, SVC AND LOADS: D-Q transformation using L-B variables, static var compensators, loads Dynamics of a synchronous generator connected to estimate bus: system model, synchronous machine model, calculation of initial conditions, inclusion of SVC Model, Analysis of single machine system, Small signal analysis with block diagram representation, synchronizing and damping torque analysis, small signal model, nonlinear oscillators.

REFERENCES:

1 **K.R. Padiyar, Power system dynamics, stability and control, BS Pub. Hydbd**

2 **P Kunder, Power system stability and control, TMH.**

3 **P. W. Sauer & M A Pai: Power system dynamics and stability: Pearson.**



COURSE OUTCOMES (COs) OF POWER SYSTEM DYNAMICS ANALYSIS AND CONTROL (MEPS-102)

After a successful completion of the course, students will be able to:

CO	**MEPS102.1**	**Remember** the advanced knowledge about methods for dynamic power system analysis, including steady state and transient stability.
CO	**MEPS102.2**	**Describe** the modeling of synchronous machines with excitation systems and hydro turbines including penstock and hydraulic system.
CO	**MEPS102.3**	**Execute** specialized insight and understanding of power-frequency control and voltage control using detailed models of turbines, generators and network. Possess advanced knowledge of modeling and dynamic analysis of large power systems, in particular power system damping issues involving modal analysis.
CO	**MEPS102.4**	**Analyse** the principle behaviour for primary control, including modeling of turbine governors and voltage controllers.
CO	**MEPS102.5**	**Assess** the construction, modeling and control of FACTS components (SVC) related to power system stability.

PROGRAMME OUTCOMES (POs):

PO-1	Engineering Knowledge:	*Apply the knowledge or mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*
PO-2	Problem Analysis:	*Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principes of mathematics, natural sciences and engineering sciences.*
PO-3	Design / development of solutions:	*Design solutions for complex engineering problems and design system components or processes to meet the specifies needs with appropriate consideration for the public health and safety and the cultural , societal and environmental consideration.*
PO-4	Conduct investigations of complex problems:	*Use research based knowledge and research method including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
PO-5	Modern tools usage:	*create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitaions.*
PO-6	The engineer and society	*Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues and the consequent responsibilites relevant to the professional engineering practice.*
PO-7	Environment and sustainability:	*Understand the impact of the professional engineering solutions in societal an d environmental context and demonstrate the knowledge of and need for sustainable development.*
PO-8	Ethics:	*Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
PO-9	Individual and team work:	*Function effectively as an indicidual and as a member or leader in diverse teams and in multidisciplinary settings.*
PO-10	Communication:	*Communicate effectively on complex engineering activites with the engineering community and with society at large as, being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.*
PO-11	Project management and finance:	*Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
PO-12	Life-long learning:	*Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical/electronics system and networks.*
PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical/electronics systems.*

PSO-3	*analyze, design, and implement control system, instrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*
PSO-4	*Application project management, techniques and computations and to power systems and electrical/ electronics systems.*

MAPPING BETWEEN COs & POs

		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO	**MEPS102.1**	2	3	2	2	1	2	1	1	2	2	2	3
CO	**MEPS102.2**	3	3	3	2	3	3	3	3	3	2	3	3
CO	**MEPS102.3**	3	3	3	3	3	3	2	3	3	2	3	3
CO	**MEPS102.4**	3	2	3	2	2	2	2	3	3	1	3	3
CO	**MEPS102.5**	3	2	3	2	2	2	2	3	3	3	3	3
TOTAL		14	13	14	11	11	12	10	13	14	10	14	15
AVERAGE		2.8	2.6	2.8	2.2	2	2.4	2	2.6	2.8	2	2.8	3
ROUND UP AVG		3	3	3	3	3	3	2	3	3	2	3	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **##** OUT OF 180 OR **##**

MAPPING BETWEEN COs & PSOs

		PSO-1	PSO-2	PSO-3	PSO-4
CO	**MEPS102.1**	2	2	3	1
CO	**MEPS102.2**	2	3	2	2
CO	**MEPS102.3**	2	3	3	1
CO	**MEPS102.4**	2	3	2	1
CO	**MEPS102.5**	1	3	2	1

TOTAL	9	14	12	6
AVERAGE	1.8	2.8	2.4	1.2
ROUND UP AVG	2	3	3	2

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **41** OUT OF 60 OR **##**

POs, PSOs, PEOs, COs, COURSE OBJECTIVES, CO-PSOs & CO-POs MAPPING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Advance Power System Protection Relays**						
COURSE CODE:	**MEPS-103**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN. :	**10**
	PRACTICAL SLOT:	END SEM.:		TERM WORK:			
	TOTAL MARKS:	**###**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**	PRACTICAL:		
TOTAL CREDITS EARNED:	**4**						
COURSE COORDINATOR:							

COURSE CONTENT:

UNIT 1: Protective Relays: Relaying review, characteristics and operating equations of relays. CT's and PT's

differential relay, over-current relay, reverse power relay, distance relays, applications of relays.

UNIT 2: STATIC RELAYS: Introduction, advantages and disadvantages, classification logic ckts, smoothing circuits, voltage regulator square wave generator, time delay ckts level detectors, summation device, sampling circuit, zero crossing detector, output devices. COMPARATORS: Replica Impedance, mixing transformers, general equation of phase and amplitude comparator, realization of ohm, impedance and off set impedance characteristics, duality principle, static amplitude comparators, coincidence circuit, Hall effect devices, Magneto receptivity, zener diode phase comparator multi input comparators.

UNIT 3: Generator and transformer protection: Protective devices for system. Protective devices for stator, rotor, and prime mover of generator, percentage differential relays protection, three winding transformer protection, earth fault protection, generator transformer unit protection.

UNIT 4: Bus bar and transmission line protection: Distance protective schemes, directional wave detection relay. Phase compensation carrier protection. High impedance differential scheme, supervisory and check relay, Some features of 500 KV relaying protection.

UNIT 5: Modern trends in power system protection: Different types of digital and computer aided relays, Microprocessor based relays, auto-reclosing, frequency relays, under and over frequency relays, di/dt relays. Algorithms for transmission line, transformer & bus bar protection; out-of-step relaying Introduction to adaptive relaying & wide area measurements

REFERENCES:

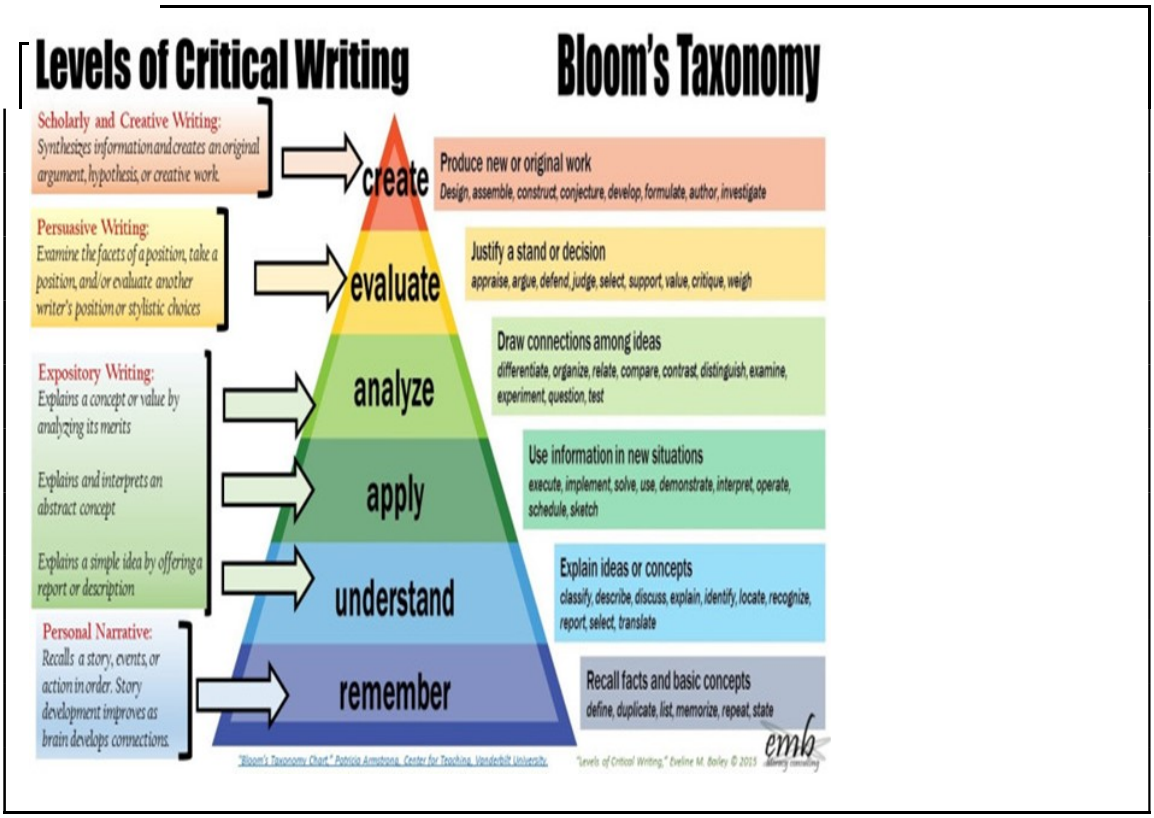
1 **Power System Protection and Switchgear, B.Ram – Tata Mc-Graw Hill Pub.**

2 **Switchgear and Protection, M.V.Deshpande - Tata Mc-Graw Hill Pub.**

3 **Power System Protection & Switchgear, Ravindra Nath, M.Chander, Willy P**

4 **Computer Relaying for power system, Arun Phadke, James Thorp, Johns W P**

5 **Power System Protection, M.A.Date, Bharti Prakashan, Vallabh Vidya N,(Guj).**



COURSE OUTCOMES (COs) OF ADVANCE POWER SYSTEM PROTECTION RELAYS (MEPS-103)

After a successful completion of the course, students will be able to:

CO	**MEPS103.1**	**Remember** current and voltage transformers and their impact on protection scheme performance. - Identify, apply, and calculate settings for over current, directional over current, distance, differential and pilot protection schemes.
CO	**MEPS103.2**	**Describe** the various types of relays, comparators and their realization using static circuits.
CO	**MEPS103.3**	**Execute**, apply, and calculate settings for power lines, transformer and generator and bus bar protection schemes.
CO	**MEPS103.4**	**Analyse** different protection schemes for protection of transmission lines and bus bars.
CO	**MEPS103.5**	**Assess** the new developments in Digital Protection. Realize the various dynamic characteristics of digital relays for protection of transmission lines and transformers.

PROGRAMME OUTCOMES (POs):

PROGRAMME SPECIFIC OUTCOMES

(PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical power system.*
PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical power systems.*
PSO-3	*analyze, design, and implement control system instrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*
PSO-4	*Application project management, techniques and computations and to electrical power systems.*

MAPPING BETWEEN COs & POs

		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO	**MEPS103.1**	3	3	3	3	3	2	1	1	3	3	2	3
CO	**MEPS103.2**	3	2	3	2	3	2	1	1	3	3	3	3
CO	**MEPS103.3**	3	2	3	3	2	1	1	1	3	3	3	3
CO	**MEPS103.4**	3	3	3	2	3	3	1	2	3	3	2	2
CO	**MEPS103.5**	3	2	3	2	3	1	2	2	3	3	2	3
TOTAL		15	12	15	12	14	9	6	7	15	15	12	14
AVERAGE		3	2.4	3	2.4	2.8	1.8	1	1.4	3	3	2.4	2.8
ROUND UP AVG		3	3	3	3	3	2	2	2	3	3	3	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **#** OUT OF 180 OR **###**

MAPPING BETWEEN COs & PSOs

		PSO-1	PSO-2	PSO-3	PSO-4
CO	**MEPS103.1**	2	3	3	2

CO	**MEPS103.2**	2	2	3	1
CO	**MEPS103.3**	2	3	2	1
CO	**MEPS103.4**	2	2	3	2
CO	**MEPS103.5**	3	3	2	2
TOTAL		11	13	13	8
AVERAGE		2	2.6	2.6	1.6
ROUND UP AVG		3	3	3	2

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **#** OUT OF 60 OR **##**

LAKSHMI NARAIN COLLEGE OF TECHNOLOGY EXCELLENCE, BHOPAL

Department of Electrical and Electronics Engineering

POs, PSOs, PEOs, COs, COURSE OBJECTIVES, CO-PSOs & CO-POs MAPPING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Power Electronics Applications to Power Systems**						
COURSE CODE:	**MEPS-104**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN. :	**10**
	PRACTICAL SLOT:	END SEM.:		TERM WORK:			
	TOTAL MARKS:	**##**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**	PRACTICAL:		
TOTAL CREDITS EARNED:	**4**						
COURSE							

COORDINATOR:

COURSE CONTENT:

UNIT 1: Power System components models formation of bus admittance matrix, algorithm for formation of bus impedance matrix. Reactive power capability of an alternator, transmission line model & loadability, Reactive power transmission & associated difficulties, Regulated shunt compensation, Models of OLTC & Phase shifting transformer, load flow study.

UNIT 2: Sensitivity analysis: Generation shift distribution factors, line outage distribution factors, Compensated shift factors. Power systems security levels, contingency selection & evaluation, security constrained economic dispatch. Pre-contingency corrective rescheduling.

UNIT 3: Voltage stability: Proximity indicators e.g. slope of PV curve, Minimum Eigen value of reduced load flow Jacobian participation factors based on modal analysis and application.

UNIT 4: Flexible ac transmission system, reactive power control, brief description and definition of FACT's controllers, shunt compensators, configuration and operating characteristics of TCR, FC-TCR, TSC, Comparisons of SVCs.

UNIT 5: Thy thyristor controlled series capacitor (TCSC) Advantages of the TCSC, Basic principle and different mode of operation, analysis variable reactance model and transient stability model of TCSC.

REFERENCES:

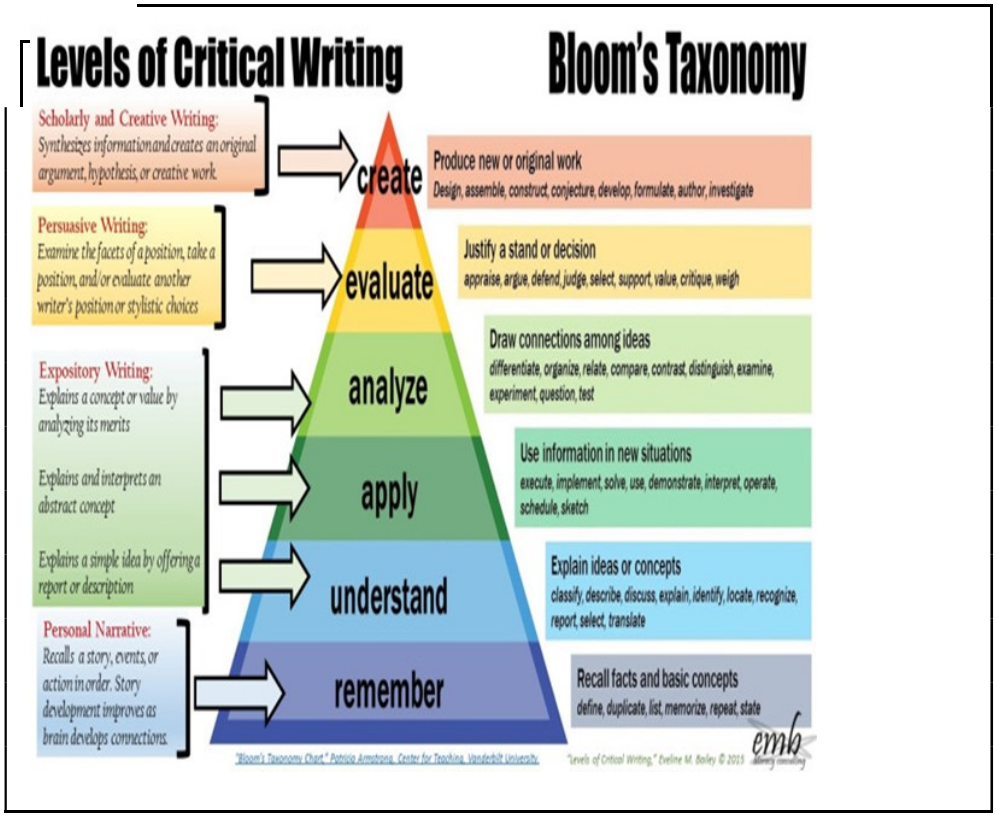
1 **Modern power system analysis D.P. Kothari, I.J. Nagrath, TMH, 2003**

2 **Power generation operation and control, A.J. Wood, B.F Woolenberg, John W**

3 **Understanding facts: Concepts and technologies of flexible AC transmission system IEEE Press, 2001 N.G. Hingorani, L. Gyugyi**

4 **Power system stability and control IEEE press P. Kundur, 1994**

5 **Thyristor Based FACTS controllers for electrical Transmission systems- R.M. Mathur, R.K. Verma, Wieldy inter science, 2002**



COURSE OUTCOMES (COs) OF POWER ELECTRONICS APPLICATIONS TO POWER SYSTEMS (MEPS-104)

After a successful completion of the course, students will be able to:

CO	**MEPS104.1**	**Remember** modeling of power system components.
CO	**MEPS104.2**	**Describe** the concepts of sensitivity and contingency analysis
CO	**MEPS104.3**	**Execute** the study voltage stability, various indicators and methods for improving voltage stability,
CO	**MEPS104.4**	**Analyse** the significance of different types of FACTS controller and their modeling for power system control.
CO	**MEPS104.5**	**Assess** the modern FACTS devices to improve steady and dynamic performance of power system.

PROGRAMME OUTCOMES (POs):

PO-1	Engineering Knowledge:	*Apply the knowledge or mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*
PO-2	Problem Analysis:	*Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principes of mathematics, natural sciences and engineering sciences.*
PO-3	Design / development of solutions:	*Design solutions for complex engineering problems and design system components or processes to meet the specifies needs with appropriate consideration for the public health and safety and the cultural , societal and environmental consideration.*
PO-4	Conduct investigations of complex problems:	*Use research based knowledge and research method including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
PO-5	Modern tools usage:	*create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitaions.*
PO-6	The engineer and society	*Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues and the consequent responsibilites relevant to the professional engineering practice.*
PO-7	Environment and sustainability:	*Understand the impact of the professional engineering solutions in societal an d environmental context and demonstrate the knowledge of and need for sustainable development.*
PO-8	Ethics:	*Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
PO-9	Individual and team work:	*Function effectively as an indicidual and as a member or leader in diverse teams and in multidisciplinary settings.*
PO-10	Communication:	*Communicate effectively on complex engineering activites with the engineering community and with society at large as, being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.*
PO-11	Project management and finance:	*Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
PO-12	Life-long learning:	*Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical power system.*

PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical power systems.*
PSO-3	*analyze, design, and implement control system instrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*
PSO-4	*Application project management, techniques and computations and to electrical power systems.*

MAPPING BETWEEN COs & POs

		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO	**MEPS104.1**	3	2	3	2	1	1	1	1	3	1	2	3
CO	**MEPS104.2**	2	3	1	2	1	1	1	1	3	2	2	3
CO	**MEPS104.3**	3	2	3	3	2	1	1	2	3	2	1	3
CO	**MEPS104.4**	3	2	3	3	2	1	1	1	3	2	2	3
CO	**MEPS104.5**	3	3	3	2	2	1	1	1	2	2	2	3
TOTAL		14	12	13	12	8	5	5	6	14	9	9	15
AVERAGE		2.8	2.4	2.6	2.4	2	1	1	1.2	2.8	1.8	1.8	3
ROUND UP AVG		3	3	3	3	2	1	1	2	3	2	2	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100

SCORE= **###** OUT OF 180 OR **###**

MAPPING BETWEEN COs & PSOs

		PSO-1	PSO-2	PSO-3	PSO-4
CO	**MEPS104.1**	2	3	2	1

CO	**MEPS10 4.2**	2	2	2	1
CO	**MEPS10 4.3**	2	2	2	1
CO	**MEPS10 4.4**	2	3	2	1
CO	**MEPS10 4.5**	1	3	3	2
TOTAL		9	13	11	6
AVERAGE		1.8	2.6	2.2	1.2
ROUND UP AVG		2	3	3	2

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCOR E= (MARKS OBTAINED / TOTAL MARKS) X 100 SCOR E= **39** OUT OF 60 OR **##**

LAKSHMI NARAIN COLLEGE OF TECHNOLOGY EXCELLENCE, BHOPAL

Department of Electrical and Electronics Engineering

POs, PSOs, PEOs, COs, COURSE OBJECTIVES, CO-PSOs & CO-POs MAPPING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Advance Course In Electrical Machines**						
COURSE CODE:	**MEPS-105**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN. :	**10**
	PRACTICAL SLOT:	END SEM.:		TERM WORK:			
	TOTAL MARKS:	**##**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**	PRACTICAL:		
TOTAL CREDITS EARNED:	**4**						
COURSE COORDINATOR:							

COURSE CONTENT:

UNIT 1: Review: Primitive machine, voltage and torque equation. Concept of transformation, change of variables, m/c variables and transform variables. Application to D.C. machine for steady state and transient analysis, equation of cross field commutator machine.

UNIT 2: Induction Machine: Voltage, torque equation for steady state operation, Equivalent circuit, Dynamic performance during sudden changes in load torque and three phase fault at the machine terminals. Voltage & torque equation for steady state operation of 1-ö induction motor & scharge motor.

UNIT 3: Synchronous Machine: Transformation equations for rotating three phase windings, Voltage and power equation for salient and non salient alternator, their phasor diagrams, Simplified equations of a synchronous machine with two damper coils.

UNIT 4: Operational Impedances and Time Constants of Synchronous Machines : Park's equations in operational form, operational impedances and G(P) for a synchronous machine with four Rotor Windings, Standard synchronous machine Reactances, time constants, Derived synchronous machine time constants, parameters from short circuit characteristics.

UNIT 5: Approximate Methods for Generator & System Analysis: The problem of power system analysis, Equivalent circuit & vector diagrams for approximate calculations, Analysis of line to line short circuit, Application of approximate method to power system analysis.

REFERENCES:

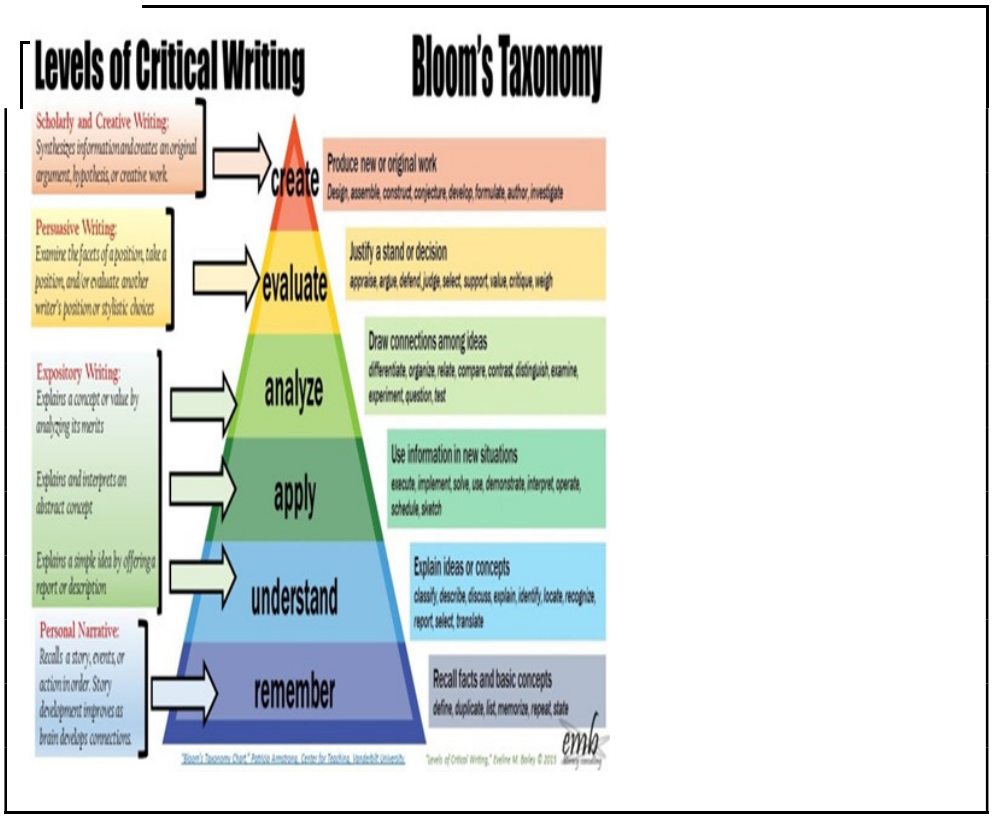
1 **Analysis of Electric Machinery - P.C.Krause**

2 **The General theory of Electrical Machines - B.Adkins**

3 **The General theory of AC Machines - B.Adkins & R.G.Harley**

4 **Generalised theory of Electrical m/c - P.S.Bhimbra**

5 **Electro Mechanical Energy Conversion - White & Woodson**



COURSE OUTCOMES (COs) OF ADVANCE COURSE IN ELECTRICAL MACHINES (MEPS-105)

After a successful completion of the course, students will be able to:

CO	**MEPS105 .1**	**Remember** the advanced knowledge on electromechanical energy conversion and mathematical models of electrical machines including application and evaluation of steady state and dynamic performance of D.C. machines.
CO	**MEPS105 .2**	**Describe** modeling, steady state and dynamic performance of single and three phase induction machine.
CO	**MEPS105 .3**	**Execute** modeling of salient and non salient synchronous generators.
CO	**MEPS105 .4**	**Analyse** and apply the concept of impedances, time constants and short circuit parameters of synchronous machines.
CO	**MEPS105 .5**	**Assess** the problems, issues and approximate methods for generator and system analysis.

PROGRAMME OUTCOMES (POs):

PO-1	Engineering Knowledge:	*Apply the knowledge or mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*
PO-2	Problem Analysis:	*Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principes of mathematics, natural sciences and engineering sciences.*
PO-3	Design / development of solutions:	*Design solutions for complex engineering problems and design system components or processes to meet the specifies needs with appropriate consideration for the public health and safety and the cultural , societal and environmental consideration.*
PO-4	Conduct investigations of complex problems:	*Use research based knowledge and research method including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
PO-5	Modern tools usage:	*create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitaions.*
PO-6	The engineer and society	*Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues and the consequent responsibilites relevant to the professional engineering practice.*
PO-7	Environment and sustainability:	*Understand the impact of the professional engineering solutions in societal an d environmental context and demonstrate the knowledge of and need for sustainable development.*
PO-8	Ethics:	*Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
PO-9	Individual and team work:	*Function effectively as an indicidual and as a member or leader in diverse teams and in multidisciplinary settings.*
PO-10	Communication:	*Communicate effectively on complex engineering activites with the engineering community and with society at large as, being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.*
PO-11	Project management and finance:	*Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
PO-12	Life-long learning:	*Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical power system.*
PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical power systems.*
PSO-3	*analyze, design, and implement control system instrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*
PSO-4	*Application project management, techniques and computations and to electrical power systems.*

MAPPING BETWEEN COs & POs

		PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PO-11**	**PO-12**
CO	**MEPS105.1**	3	3	3	2	1	1	1	1	3	2	2	3
CO	**MEPS105.2**	3	2	3	3	1	1	1	2	3	1	2	3
CO	**MEPS105.3**	3	2	3	2	1	1	1	1	3	2	2	3
CO	**MEPS105.4**	3	2	3	3	2	1	1	1	3	2	2	3
CO	**MEPS105.5**	3	3	2	3	1	1	1	1	3	1	2	3
TOTAL		15	#	14	13	6	5	5	6	15	8	10	15
AVERAGE		3	2	3	2.6	1.2	1	1	1	3	2	2	3
ROUND UP AVG		3	3	3	3	2	1	1	2	3	2	2	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE = (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE = **#** OUT OF 180 OR **##**

MAPPING BETWEEN COs & PSOs

		PSO -1	PSO -2	PSO-3	PSO -4
CO	**MEPS105 .1**	2	3	1	1
CO	**MEPS105 .2**	2	3	2	2
CO	**MEPS105 .3**	2	3	2	1
CO	**MEPS105 .4**	1	2	2	2
CO	**MEPS105 .5**	2	2	3	1
TOTAL		9	#	10	7
AVERAGE		2	3	2	1.4
ROUND UP AVG		2	3	2	2

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE = (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE = **#** OUT OF 60 OR **# #**

POs, PSOs, PEOs, COs, COURSE OBJECTIVES, CO-PSOs & CO-POs MAPPING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Reactive Power Control & FACTS**						
COURSE CODE:	**MEPS-201**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN.:	**10**
	PRACTICAL SLOT:	END SEM.:		TERM WORK:			
	TOTAL MARKS:	**###**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**	PRACTICAL:		
TOTAL CREDITS EARNED:	**4**						
COURSE COORDINATOR:							

COURSE CONTENT:

UNIT 1: Description and definition of Introduction to FACTS: Basic Types of ccontrollers – Benefits from FACTS

technology- Static Var Compensator (SVC): Principle of operation, configuration and control. Thyristor Controlled Series compensator (TCSC): Principle of operation, configuration and control, Application for damping electromechanical Oscillations, Application for mitigation of SSR. Static Compensator (STATCOM): Principle of operation, configuration and control. Static Synchronous Series Compensator (SSSC): Principle of operation, configuration and control. Thyristor Controlled Phase Angle Regulator (TCPAR): Principle of operation, configuration and control, Unified Power Flow Controller (UPFC): Principle of operation, configuration and control, Simulation of UPFC, Steady state model of UPFC. Interline Power Flow Controller (IPFC): Principle of operation, configuration and control.

UNIT 2: Oscillation Stability Analysis and Control: Introduction – Linearised model of power systems installed with FACTS based Stabilisers – Heffron-Phillips model of a SMIB system installed with SVC, TCSC and TCPS – Heffron-Phillips model of a SMIB system with UPFC – Heffron- Phillips model of a Multi-machine system installed with SVC, TCSC and TCPS

UNIT 3: Analysis and Design of FACTS based stabilisers: Analysis of damping torque contribution by FACTS based stabilisers installed in SMIB systems, Design of robust FACTS based stabilisers installed in SMIB systems by phase compensation method. Selection of installing locations and feed back signal for FACTS based stabilizers

UNIT 4: Transient Stability control with FACTS: Introduction – Analysis of Power systems installed with FACTS devices: Power transmission control using Controllable Series Compensation(CSC), Power Transmission Control using SSSC, Power Transmission Control using UPFC, Power Transmission Control using Phase Shifting Transformer(PST), Power Transmission Control using UPFC, Control of FACTS devices for transient stability improvement – General considerations of FACTS control strategy: CSC,SSSC, SVC, STATCOM and UPFC control strategy – General Structure of the FACTS devices control.

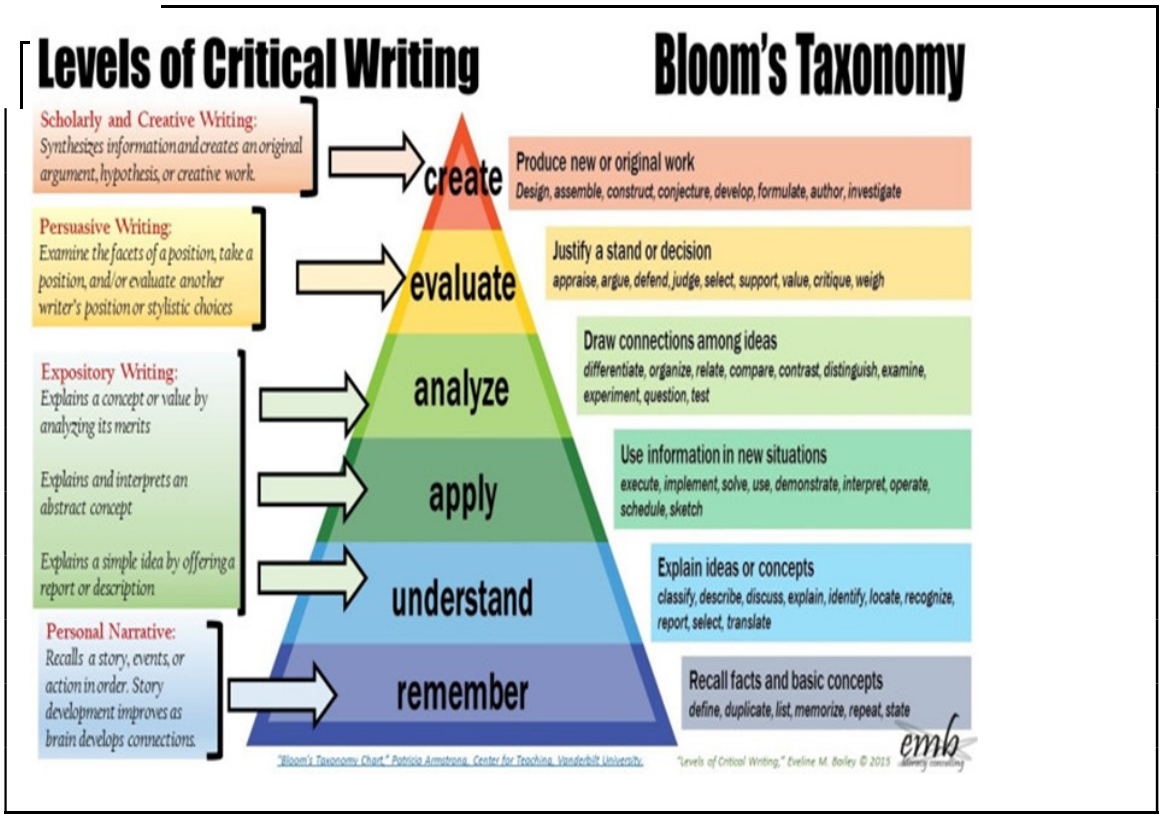
REFERENCES:

1 **Reactive Power Control in Power Systems, T J E Miller John Wiley.**

2 **Computer modeling of Electrical Power Systems, J Arriliga, N R Watson, Wiley**

3 **Understanding FACTS' N G Hingorani and L Gyugyi, IEEE Press.**

4 **Flexible ac Transmission Systems (FACTS), Y.H. Song, A.T.Johns,IEEE P.**



COURSE OUTCOMES (COs) OF REACTIVE POWER CONTROL & FACTS (MEPS-201)

After a successful completion of the course, students will be able to:

CO	**MEPS201.1**	**Remember** various types of controllers used in FACTS by knowing its application operation alongwith UPFC and IPFC.
CO	**MEPS201.2**	**Describe** oscillation stability analysis of linearised model of electrical power system with various FACTS based stabilisers such Heffron-Phillips model of a SMIB system.
CO	**MEPS201.3**	**Execute** the varous behaviour of FACTS based stabiliser in SMIB system.
CO	**MEPS201.4**	**Analyse** the damping torque contribution by FACTS based stabiliser installed in SMIB system by phase compensation method. Identify the installed location of FACTS based stabiliser.
CO	**MEPS201.5**	**Assess** the transient stability control with FACTS devices using CSC,SSSC,SVC,STATCOM and UPFC control.

PROGRAMME OUTCOMES (POs):

PO-1	Engineering Knowledge:	*Apply the knowledge or mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*

PO-2	Problem Analysis:	*Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principes of mathematics, natural sciences and engineering sciences.*
PO-3	Design / development of solutions:	*Design solutions for complex engineering problems and design system components or processes to meet the specifies needs with appropriate consideration for the public health and safety and the cultural , societal and environmental consideration.*
PO-4	Conduct investigations of complex problems:	*Use research based knowledge and research method including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
PO-5	Modern tools usage:	*create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitaions.*
PO-6	The engineer and society	*Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues and the consequent responsibilites relevant to the professional engineering practice.*
PO-7	Environment and sustainability:	*Understand the impact of the professional engineering solutions in societal an d environmental context and demonstrate the knowledge of and need for sustainable development.*
PO-8	Ethics:	*Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
PO-9	Individual and team work:	*Function effectively as an indicidual and as a member or leader in diverse teams and in multidisciplinary settings.*
PO-10	Communication:	*Communicate effectively on complex engineering activites with the engineering community and with society at large as, being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.*
PO-11	Project management and finance:	*Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
PO-12	Life-long learning:	*Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical power system.*
PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical power systems.*
PSO-3	*analyze, design, and implement control system instrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*

PSO-4	*Application project management, techniques and computations and to electrical power systems.*

MAPPING BETWEEN COs & POs

		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO	**MEPS201.1**	3	3	3	2	3	2	2	2	3	2	3	3
CO	**MEPS201.2**	3	3	2	3	3	2	1	2	3	3	2	3
CO	**MEPS201.3**	3	3	3	2	2	2	2	2	3	3	2	3
CO	**MEPS201.4**	3	3	2	3	2	2	1	2	3	3	2	3
CO	**MEPS201.5**	3	3	3	3	3	2	2	2	3	3	2	3
TOTAL		15	15	13	13	13	10	8	10	15	14	11	15
AVERAGE		3	3	2.6	2.6	2.6	2	1.6	2	3	2.8	2.2	3
ROUND UP AVG		3	3	3	3	3	2	2	2	3	3	3	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **###** OUT OF 180 OR **84%**

MAPPING BETWEEN COs & PSOs

		PSO-1	PSO-2	PSO-3	PSO-4
CO	**MEPS201.1**	3	3	3	2
CO	**MEPS201.2**	3	2	3	2
CO	**MEPS201.3**	3	3	2	2
CO	**MEPS201.4**	3	3	2	3
CO	**MEPS201.5**	2	2	3	2
TOTAL		14	13	13	11
AVERAGE		2.8	2.6	2.6	2.2

ROUND UP AVG	3	3	3	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **51** OUT OF 60 OR **###**

Department of Electrical and Electronics Engineering

POs, PSOs, PEOs, COs, COURSE OBJECTIVES, CO-PSOs & CO-POs MAPPING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Energy Conservation and Mgt**						
COURSE CODE:	**MEPS-202**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN. :	**10**
	PRACTICAL SLOT:	END SEM.:		TERM WORK:			
	TOTAL MARKS:	**100**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**	PRACTICAL:		
TOTAL CREDITS EARNED:	**4**						
COURSE COORDINATOR:							

COURSE CONTENT:

UNIT 1: General energy problem: Energy use patterns and scope for conservation. Energy audit: Energy monitoring, Energy accounting and analysis, Auditing and targeting. Energy conservation policy, Energy management & audit, Energy audit, Types of energy audit, energy management (audit), qualities and function of energy managers, language of an energy manager, Questionnaire, Check list for top management, Loss of energy in material flow, energy performance, Maximizing system efficiency, Optimizing, input energy requirements, Energy auditing instruments, Material load energy balance diagram.

UNIT 2: Thermodynamics of Energy Conservation, Basic principle, Irreversibility and second law, efficiency analysis of systems, Primary energy sources, optimum use of prime-movers, energy efficient house keeping, energy recovery in thermal systems, waste heat recovery techniques, thermal insulation, Thermal energy audit in heating, ventilation and air conditioning. Maintenance and Energy audit, friction, lubrication and tribo-logical innovations. Predictive and preventive maintenance

UNIT 3: Load curve analysis & load management DSM, Energy storage for power systems (Mechanical, Thermal, Electrical & Magnetic) Restructuring of electric tariff from energy conservation consideration, Economic analysis depreciation method, time value of money, Evaluation method of projects, replacement analysis, special problems inflation risk analysis. Pay back period, Energy
economics, Cost Benefit Risk analysis, Pay back period.

UNIT 4: Energy efficient electric drives, Energy efficient motors V.S.D. power factor improvement in power system, Energy Conservation in transportation system especially in electric vehicle. Energy flow networks, Simulation & modeling, formulation & Objective & constraints, alternative option, Matrix chart.

UNIT 5: Energy conservation task before industry, Energy conservation equipments, Co-Generation, Energy conservation in Sugar, Textiles, Cement, process industry, Electrical Energy Conservation in building, heating, lighting, domestic gadgets

REFERENCES:

1 **Energy Management – W.R. Murphy & G. Mckey Butler worths.**

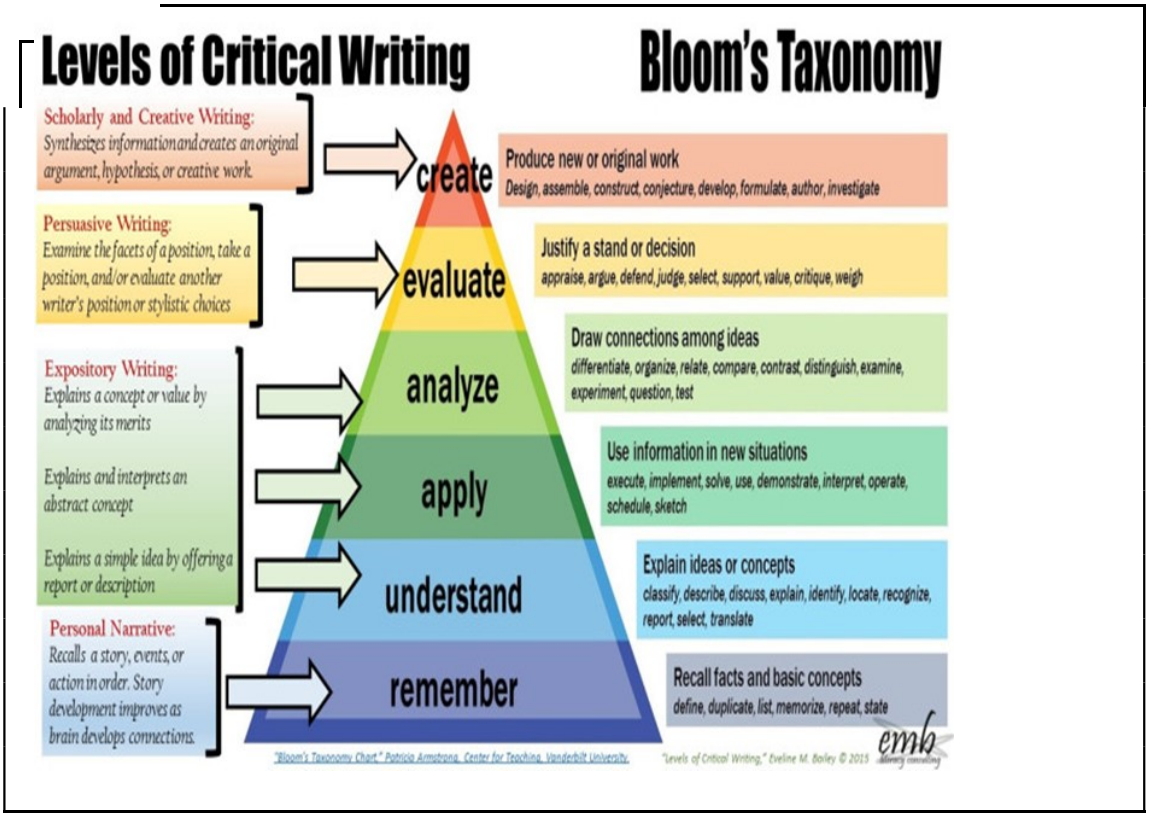
2 **Energy Management Head Book- W.C. Turner, John Wiley**

3 **Energy Management Principles- Craig B. Smith, Pergamon Press**

4 **Energy Conservation- Paul O Callagan- Pergamon Press**

5 **Design & Management of energy conservation. Callaghan,**

6 **Elect, Energy Utilization & Conservation. Dr. Tripathi S.C.,**



COURSE OUTCOMES (COs) OF ENERGY CONSERVATION AND MANAGEMET (MEPS-202)

After a successful completion of the course, students will be able to:

CO	**MEPS202.1**	**Remember** the various concepts related to energy conservation & audit such as policy, types, functions of energy managers, questionnaire, loss of energy, efficiency, optimization, instruments and material energy balance.
CO	**MEPS202.2**	**Describe** the complete concept of Thermodynamics of energy conservation and efficient house keeping, heat recovery, thermal insulation, heat audit, ventilation and air conditioning, lubricants and preventive/preventive maintenance
CO	**MEPS202.3**	**Execute** the concept of load side management including tariff, economic analysis, time value of money, pay back period.
CO	**MEPS202.4**	**Analyse** the concepts of efficient electric drives, for transportation using electric vehicle and energy flow networks.
CO	**MEPS202.5**	**Assess** the detail information of energy conservation in Sugar, textiles, Cement, process industry. Electrical energy conservation in building, heating, lighting and domestic gadgests.

PROGRAMME OUTCOMES (POs):

PO-1	Engineering Knowledge:	*Apply the knowledge or mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*

PO-2	Problem Analysis:	*Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principes of mathematics, natural sciences and engineering sciences.*
PO-3	Design / development of solutions:	*Design solutions for complex engineering problems and design system components or processes to meet the specifies needs with appropriate consideration for the public health and safety and the cultural , societal and environmental consideration.*
PO-4	Conduct investigations of complex problems:	*Use research based knowledge and research method including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
PO-5	Modern tools usage:	*create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitaions.*
PO-6	The engineer and society	*Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues and the consequent responsibilites relevant to the professional engineering practice.*
PO-7	Environment and sustainability:	*Understand the impact of the professional engineering solutions in societal an d environmental context and demonstrate the knowledge of and need for sustainable development.*
PO-8	Ethics:	*Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
PO-9	Individual and team work:	*Function effectively as an indicidual and as a member or leader in diverse teams and in multidisciplinary settings.*
PO-10	Communication:	*Communicate effectively on complex engineering activites with the engineering community and with society at large as, being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.*
PO-11	Project management and finance:	*Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
PO-12	Life-long learning:	*Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical/electronics system and networks.*
PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical/electronics systems.*
PSO-3	*analyze, design, and implement control systeminstrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*

PSO-4	*Application project management, techniques and computations and to power systems and electrical/ electronics systems.*

MAPPING BETWEEN COs & POs

		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO	**MEPS202.1**	3	2	2	3	3	3	3	3	3	2	2	3
CO	**MEPS202.2**	3	2	3	3	3	2	2	3	3	1	2	3
CO	**MEPS202.3**	3	2	2	3	3	3	3	3	3	2	2	3
CO	**MEPS202.4**	3	2	3	3	3	2	2	3	3	1	2	3
CO	**MEPS202.5**	3	2	2	3	2	3	3	3	2	2	2	2
TOTAL		15	10	12	15	14	13	13	15	14	8	10	14
AVERAGE		3	2	2.4	3	2.8	2.6	3	3	2.8	1.6	2	2.8
ROUND UP AVG		3	2	3	3	3	3	3	3	3	2	2	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **#** OUT OF 180 OR **###**

MAPPING BETWEEN COs & PSOs

		PSO-1	PSO-2	PSO-3	PSO-4
CO	**MEPS202.1**	3	3	2	2
CO	**MEPS202.2**	2	2	3	2
CO	**MEPS202.3**	3	3	2	2
CO	**MEPS202.4**	2	2	3	1
CO	**MEPS202.5**	2	2	2	1
TOTAL		12	12	12	8
AVERAGE		2.4	2.4	2.4	1.6

ROUND UP AVG	3	3	3	2

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **#** OUT OF 60 OR **##**

LAKSHMI NARAIN COLLEGE OF TECHNOLOGY EXCELLENCE, BHOPAL

Department of Electrical and Electronics Engineering

POs, PSOs, PEOs, COs, COURSE OBJECTIVES, CO-PSOs & CO-POs MAPPING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Power Quality and Conditioning**						
COURSE CODE:	**MEPS-203**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN. :	**10**
	PRACTICAL SLOT:	END SEM.:		TERM WORK:			
	TOTAL MARKS:	**100**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**	PRACTICAL:		
TOTAL CREDITS EARNED:	**4**						
COURSE COORDINATOR:							

COURSE CONTENT:

UNIT 1: Understanding Power quality, types of power quality disturbances, power quality indices, Causes and effects of power quality disturbances

UNIT 2: Causes and effects of harmonics, converter configuration and their contribution to supply harmonics, other sources of harmonics

UNIT 3: Radio interference, supply standards, elimination/suppression of harmonics, classical solutions & their drawbacks, passive input filters,design of harmonic filters,Improved power quality converter topologies,(single and three phase), transformer connections,
Elimination/suppression of harmonics using active power filters – topologies, and their control methods, PWM converter as a voltage source active filter, current source active filter,

UNIT 4: Active waveshaping of input line current, constant frequency control, constant tolerance band control, variable tolerance band control, discontinuous current control,Electromagnetic interference(EMI), EMI generation ,EMI standards,and elimination.

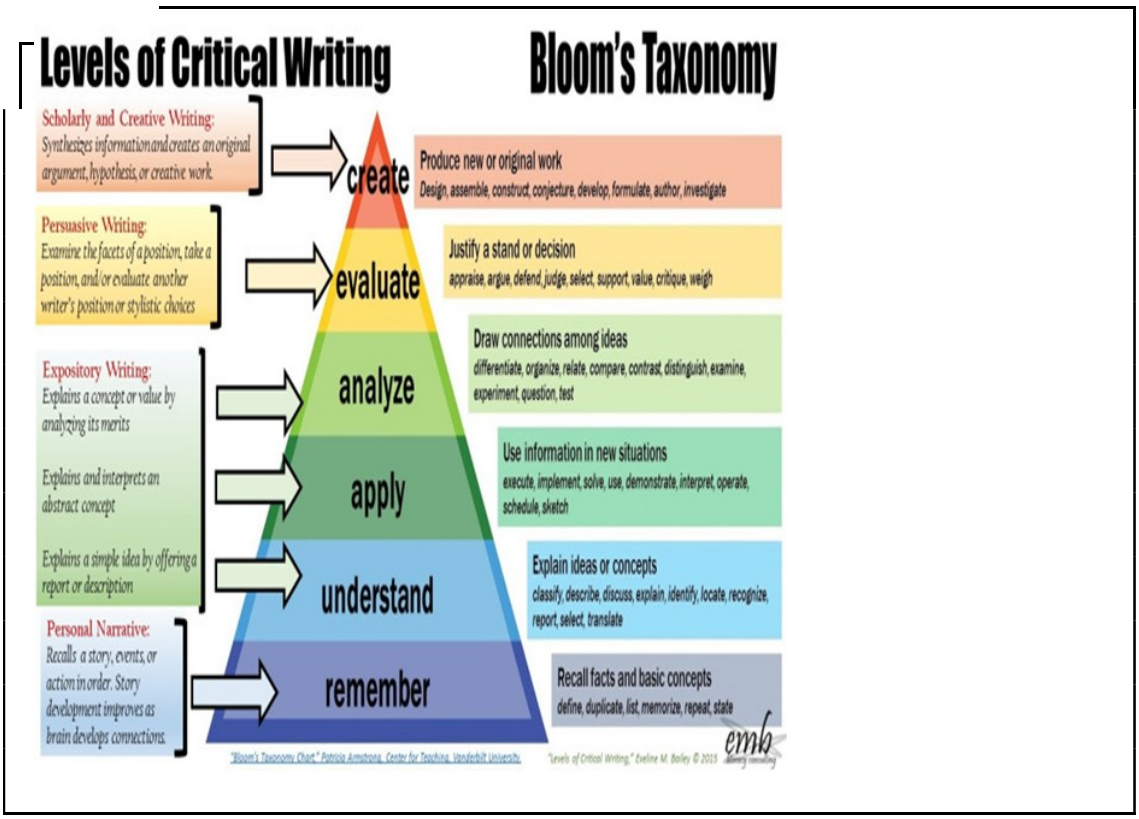
REFERENCES:

1 **Power Quality – by R.C. Duggan**

2 **Power system harmonics – by A.J. Arrillga**

3 **Power electronic converter harmonics – by Derek A. Paice**

4 **Power Electronics –Mohan,Undeland,Robbins**



COURSE OUTCOMES (COs) OF POWER QUALITY AND CONDITIONING (MEPS-203)

After a successful completion of the course, students will be able to:

CO	**MEPS203.1**	**Remember** the concept of power quality and its causes and effects.
CO	**MEPS203.2**	**Describe** the causes and effects of harmonics alons with converter configuration for its contribution.
CO	**MEPS203.3**	**Execute** the concept to reduce the methods of harmonics in the line.
CO	**MEPS203.4**	**Analyse** the different concept of methods to control the wave shape of currents and voltage.
CO	**MEPS203.5**	**Assess** the contribution of electromagnetic interference.

PROGRAMME OUTCOMES (POs):

PO-1	Engineering Knowledge:	*Apply the knowledge or mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*
PO-2	Problem Analysis:	*Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principes of mathematics, natural sciences and engineering sciences.*
PO-3	Design / development of solutions:	*Design solutions for complex engineering problems and design system components or processes to meet the specifies needs with appropriate consideration for the public health and safety and the cultural , societal and environmental consideration.*
PO-4	Conduct investigations of complex problems:	*Use research based knowledge and research method including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
PO-5	Modern tools usage:	*create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitaions.*
PO-6	The engineer and society	*Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues and the consequent responsibilites relevant to the professional engineering practice.*
PO-7	Environment and sustainability:	*Understand the impact of the professional engineering solutions in societal an d environmental context and demonstrate the knowledge of and need for sustainable development.*
PO-8	Ethics:	*Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
PO-9	Individual and team work:	*Function effectively as an indicidual and as a member or leader in diverse teams and in multidisciplinary settings.*
PO-10	Communication:	*Communicate effectively on complex engineering activites with the engineering community and with society at large as, being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.*
PO-11	Project management and finance:	*Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
PO-12	Life-long learning:	*Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical/electronics system and networks.*
PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical/electronics systems.*

PSO-3	*analyze, design, and implement control systeminstrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*
PSO-4	*Application project management, techniques and computations and to power systems and electrical/ electronics systems.*

MAPPING BETWEEN COs & POs

		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO	**MEPS203.1**	3	2	3	2	1	1	1	1	3	1	2	3
CO	**MEPS203.2**	2	3	1	2	1	1	1	1	3	2	2	3
CO	**MEPS203.3**	3	2	3	3	2	1	1	2	3	2	1	3
CO	**MEPS203.4**	3	2	3	3	2	1	2	1	3	2	2	3
CO	**MEPS203.5**	3	3	3	2	2	1	1	2	2	2	2	3
TOTAL		14	12	13	12	8	5	6	7	14	9	9	15
AVERAGE		2.8	2.4	3	2.4	1.6	1	1.2	1	2.8	1.8	1.8	3
ROUND UP AVG		3	3	3	3	2	1	2	2	3	2	2	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **###** OUT OF 180 OR **##**

MAPPING BETWEEN COs & PSOs

		PSO-1	PSO-2	PSO-3	PSO-4
CO	**MEPS203.1**	2	3	2	1
CO	**MEPS203.2**	2	2	2	1
CO	**MEPS203.3**	2	2	2	1
CO	**MEPS203.4**	2	3	2	1
CO	**MEPS203.5**	1	3	3	3

TOTAL	9	13	11	7
AVERAGE	1.8	2.6	2	1.4
ROUND UP AVG	2	3	3	2

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **40** OUT OF 60 OR **##**

POs, PSOs, PEOs, COs, COURSE OBJECTIVES, CO-PSOs & CO-POs MAPPING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Restructed Power Systems**						
COURSE CODE:	**MEPS-204**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN.:	**10**
	PRACTICAL SLOT:	END SEM.:		TERM WORK:			
	TOTAL MARKS:	**100**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**	PRACTICAL:		
TOTAL CREDITS EARNED:	**4**						
COURSE COORDINATOR:							

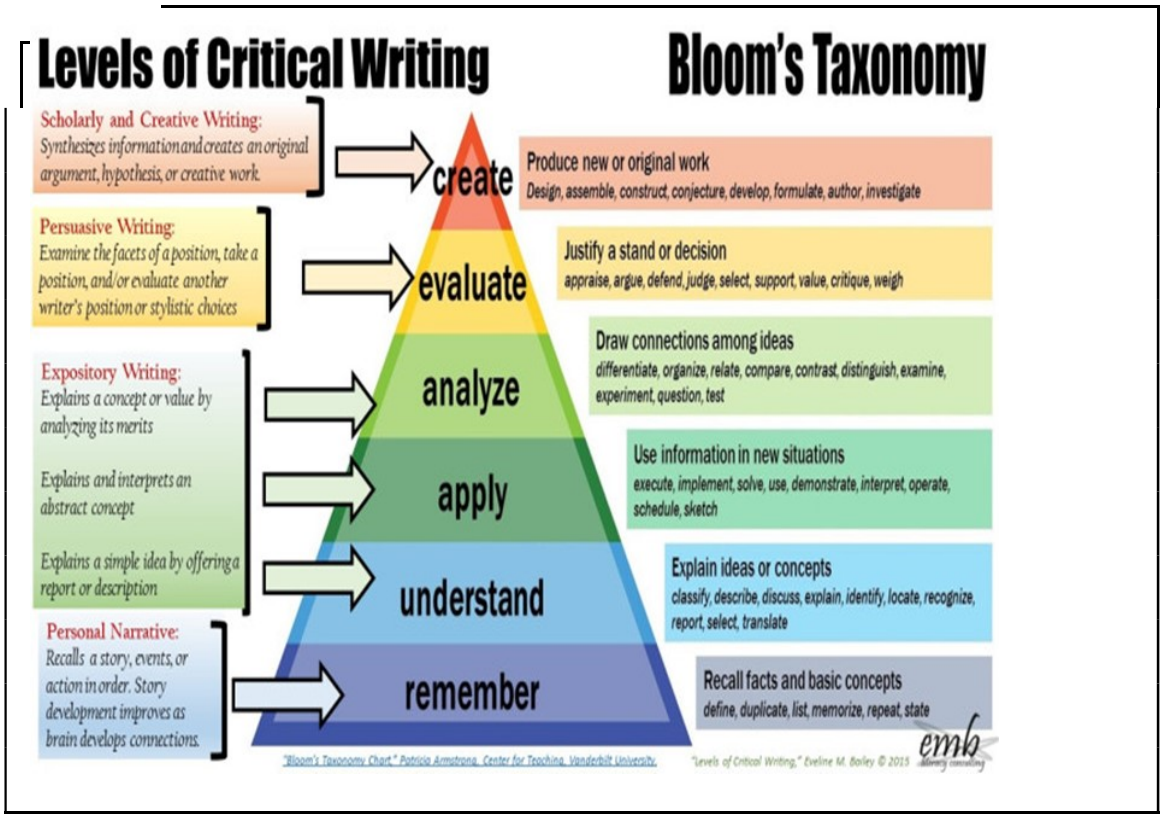
COURSE CONTENT:

Fundamentals of restructured system, Market Architecture, Load Elasticity, Social welfare

maximization, OPF: Role in vertically integrated systems and in restructured markets, Congestion Management, Optimal Bidding, Risk assessment and Hedging, Transmission Pricing and Tracing of power, Ancillary Services, Standard Market Design, Distributed Generation in restructured markets, Developments in India, IT applications in restructured markets, Working of restructured power systems : PJM.

REFERENCES:

1. **Understanding electric utilities and de-regulation, Lorrin Philipson, H. Lee Willis, Marcel Dekker Pub., 1998.**
2. **Power system economics: designing markets for electricity Steven Stoft, John Wiley & Sons, 2002.**
3. **Operation of restructured power systems. Kankar Bhattacharya, Jaap E. Daadler, Math H.J. Boolen, Kluwer Academic Pub., 2001.**
4. **Restructured electrical power systems: operation, trading and volatility Mohammad Shahidehpour, Muwaffaq Alomoush, Marcel Dekker Pub., 2001**



COURSE OUTCOMES (COs) OF RESTRUCTURED POWER SYSTEMS (MEPS-204)

After a successful completion of the course, students will be able to:

CO	**MEPS204.1**	**Remember** specialized insight and understanding of operation of deregulated electricity market systems.
CO	**MEPS204.2**	**Describe** specialized insight about the issues in electricity markets and how these are handled world-wide in various markets (including India).
CO	**MEPS204.3**	**Execute** the various types of electricity market operational and control issues under congestion management.
CO	**MEPS204.4**	**Analyse** the operation of ancillary services.
CO	**MEPS204.5**	**Assess** the different pricing mechanism and power trading in restructured power system.

PROGRAMME OUTCOMES (POs):

PO-1	Engineering Knowledge:	*Apply the knowledge or mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*
PO-2	Problem Analysis:	*Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principes of mathematics, natural sciences and engineering sciences.*
PO-3	Design / development of solutions:	*Design solutions for complex engineering problems and design system components or processes to meet the specifies needs with appropriate consideration for the public health and safety and the cultural , societal and environmental consideration.*
PO-4	Conduct investigations of complex problems:	*Use research based knowledge and research method including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
PO-5	Modern tools usage:	*create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitaions.*
PO-6	The engineer and society	*Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues and the consequent responsibilites relevant to the professional engineering practice.*
PO-7	Environment and sustainability:	*Understand the impact of the professional engineering solutions in societal an d environmental context and demonstrate the knowledge of and need for sustainable development.*
PO-8	Ethics:	*Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
PO-9	Individual and team work:	*Function effectively as an indicidual and as a member or leader in diverse teams and in multidisciplinary settings.*
PO-10	Communication:	*Communicate effectively on complex engineering activites with the engineering community and with society at large as, being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.*

PO-11	Project management and finance:	*Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
PO-12	Life-long learning:	*Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical power system.*
PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical power systems.*
PSO-3	*analyze, design, and implement control system instrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*
PSO-4	*Application project management, techniques and computations and to electrical power systems.*

MAPPING BETWEEN COs & POs

		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO	**MEPS204.1**	2	1	1	3	1	2	1	2	3	3	2	2
CO	**MEPS204.2**	2	1	1	2	1	2	1	2	3	1	2	3
CO	**MEPS204.3**	2	1	1	2	1	2	1	2	3	1	2	3
CO	**MEPS204.4**	2	1	1	1	0	2	1	2	2	0	2	3
CO	**MEPS204.5**	2	1	1	1	0	2	1	2	2	0	2	3
TOTAL		10	5	5	9	3	10	5	10	13	5	10	14
AVERAGE		2	1	1	1.8	0.6	2	1	2	2.6	1	2	2.8
ROUND UP AVG		2	1	1	2	1	2	1	2	3	1	2	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **99** OUT OF 180 OR **###**

MAPPING BETWEEN COs & PSOs

		PSO-1	PSO-2	PSO-3	PSO-4
CO	**MEPS204.1**	1	0	1	2
CO	**MEPS204.2**	3	1	2	1
CO	**MEPS204.3**	1	1	1	1
CO	**MEPS204.4**	1	2	1	1
CO	**MEPS204.5**	1	1	1	1
TOTAL		7	5	6	6
AVERAGE		1.4	1	1.2	1.2
ROUND UP AVG		2	1	2	2

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **24** OUT OF 60 OR **###**

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Power System Transients**						
COURSE CODE:	**MEPS-205**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN. :	**10**
	PRACTICAL SLOT:	END SEM.:				TERM WORK:	
	TOTAL MARKS:	**100**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**	PRACTICAL:		
TOTAL CREDITS EARNED:	**4**						
COURSE COORDINATOR:							

COURSE CONTENT:

UNIT 1: Origin and nature of transients and surges. Equivalent circuit representations. Lumped and distributed circuit transients. Line energisation and de-energisation transients. Earth and earthwire effects.
UNIT 2: Current chopping in circuit breakers. Short line fault condition and its relation to circuit breaker duty.

Trapped charge effects. Effect of source and source representation in short line fault studies. Control of transients.

UNIT 3: Lightning phenomena. Influence of tower footing resistance and earth resistance. Traveling waves in distributed parameter multi-conductor lines, parameters as a function of frequency.

UNIT 4: Simulation of surge diverters in transient analysis. Influence of pole opening and pole closing. Fourier integral and Z transform methods in power system transients.

UNIT 5: Insulation Coordination : overvoltage limiting devices, dielectric properties, breakdown of gaseous insulation, tracking and erosion of insulation, high current arcs.

REFERENCES:

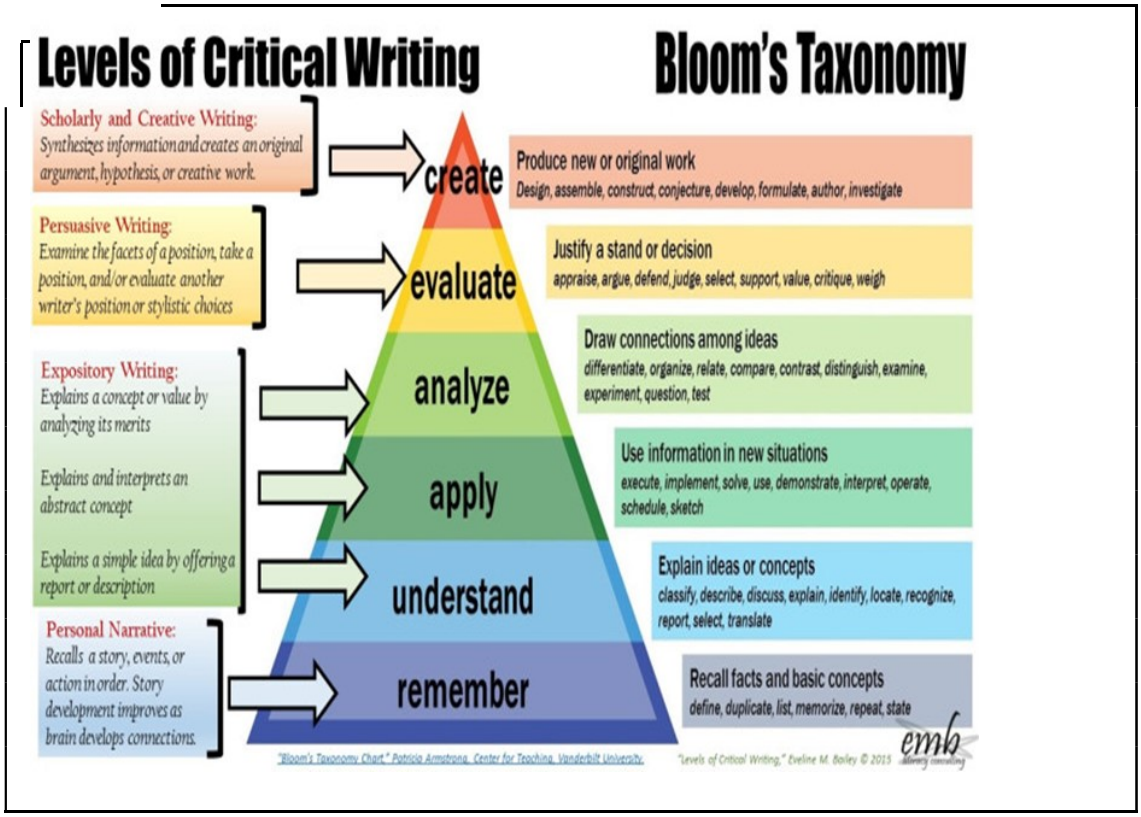
1 **Power System Transients by Vanikov**

2 **Power System Transients by C. S. Indulkar and D.P. Kothari**

3 **Power Circuit breaker theory and design by Flurscheim C.H.**

4 **EMTP Rulebook**

5 **EMTDC/PSCAD Rulebook**



COURSE OUTCOMES (COs) OF POWER SYSTEM TRANSIENT (MEPS-205)

After a successful completion of the course, students will be able to:

CO	**MEPS205.1**	**Remember** the origin and nature and type of power system transients.
CO	**MEPS205.2**	**Describe** the switching transients and damping of transients for short line fault studies.
CO	**MEPS205.3**	**Execute** specialized insight and understanding about the travelling surges and lighting phenomena and fast transients in transmission lines.
CO	**MEPS205.4**	**Analyse** surges and switching transients using simulation and other analytical tools and packages.
CO	**MEPS205.5**	**Assess** the insulation coordination procedures for high voltages systems.

PROGRAMME OUTCOMES (POs):

PO-1	Engineering Knowledge:	*Apply the knowledge or mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*

PO-2	Problem Analysis:	*Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principes of mathematics, natural sciences and engineering sciences.*
PO-3	Design / development of solutions:	*Design solutions for complex engineering problems and design system components or processes to meet the specifies needs with appropriate consideration for the public health and safety and the cultural , societal and environmental consideration.*
PO-4	Conduct investigations of complex problems:	*Use research based knowledge and research method including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
PO-5	Modern tools usage:	*create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitaions.*
PO-6	The engineer and society	*Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues and the consequent responsibilites relevant to the professional engineering practice.*
PO-7	Environment and sustainability:	*Understand the impact of the professional engineering solutions in societal an d environmental context and demonstrate the knowledge of and need for sustainable development.*
PO-8	Ethics:	*Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
PO-9	Individual and team work:	*Function effectively as an indicidual and as a member or leader in diverse teams and in multidisciplinary settings.*
PO-10	Communication:	*Communicate effectively on complex engineering activites with the engineering community and with society at large as, being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.*
PO-11	Project management and finance:	*Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
PO-12	Life-long learning:	*Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical power system.*
PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical power systems.*
PSO-3	*analyze, design, and implement control system instrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*

PSO-4	*Application project management, techniques and computations and to electrical power systems.*

MAPPING BETWEEN COs & POs

		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO	**MEPS205.1**	3	1	1	2	1	1	1	1	2	0	1	2
CO	**MEPS205.2**	3	3	3	3	2	2	1	2	3	2	1	2
CO	**MEPS205.3**	3	3	1	2	2	2	2	1	3	2	1	3
CO	**MEPS205.4**	3	3	3	3	2	2	1	2	3	3	2	3
CO	**MEPS205.5**	3	2	2	1	1	1	1	1	2	2	2	2
TOTAL		15	12	10	11	8	8	6	7	13	9	7	12
AVERAGE		3	2.4	2	2.2	1.6	1.6	1.2	1.4	2.6	1.8	1.4	2.4
ROUND UP AVG		3	3	2	3	2	2	2	2	3	2	2	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **118** OUT OF 180 OR **##**

MAPPING BETWEEN COs & PSOs

		PSO-1	PSO-2	PSO-3	PSO-4
CO	**MEPS205.1**	3	2	1	2
CO	**MEPS205.2**	2	3	2	2
CO	**MEPS205.3**	2	3	2	1
CO	**MEPS205.4**	1	2	2	1
CO	**MEPS205.5**	2	1	1	1
TOTAL		10	11	8	7
AVERAGE		2	2.2	1.6	1.4

ROUND UP AVG	2	3	2	2

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **36** OUT OF 60 OR **##**

Department of Electrical and Electronics Engineering

POs, PSOs, PEOs, COs, COURSE OBJECTIVES, CO-PSOs & CO-POs MAPPING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Power System Instrumentation**						
COURSE CODE:	**MEPS-301**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN. :	**10**
	PRACTICAL SLOT:	END SEM.:		TERM WORK:			
	TOTAL MARKS:	**##**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**	PRACTICAL:		
TOTAL CREDITS EARNED:	**4**						
COURSE COORDINATOR:							

COURSE CONTENT:

UNIT 1: Introduction to instrumentation and control of energy systems, display instruments, recorders.

UNIT 2: Transducers, sensors, actuators such as pressure, temperature, velocity, speed, volume, torque and solar flux measuring devices, current, voltage and power factor.

UNIT 3:Gas analysers, power plants and industrial instrumentation and pollution monitoring devices.

UNIT 4: Signal conditioning of inputs, single channel and multichannel data acquisition system, D/A and A/D converters, data loggers, supervisory control.

UNIT 5: Data transmission systems, Advantage and disadvantage of digital transmission over anolog. Time division multiplexing, pulse modulation, digital modulation.

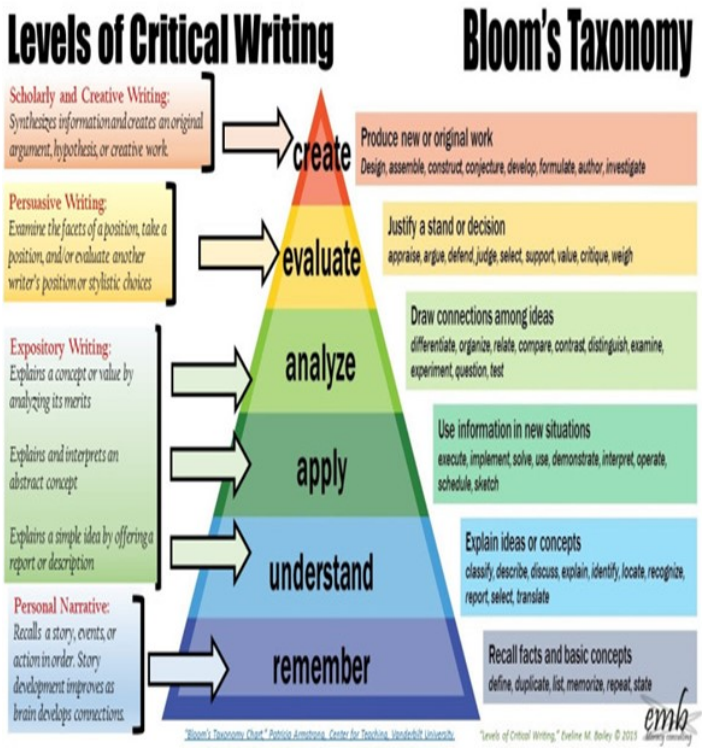
REFERENCES:

1 **Transducers & Instrumentation by D.V.S. Murty – PHI Prentice Hall**

2 **Electronic Instrumentation by H.S.Kalsi – Tata McGraw Hill**

3 **Electrical and Electronics Measurement and Instr., A.K.Sawhney, Dhanpat Rai 4. 4.**

4 **Instrumentation devices and systems by C.S.Rangan and G.R. Sharma, TMH**



COURSE OUTCOMES (COs) OF POWER SYSTEM INSTRUMENTATION (MEPS-301)

After a successful completion of the course, students will be able to:

CO	**MEPS301.1**	**Remember** basic concept of instruments, various recording and display instruments.
CO	**MEPS301.2**	**Describe** various transducers, sensors, actuators for pressure, temperature, velocity, speed, volume, torque, solar flux, current, voltage and power factor.
CO	**MEPS301.3**	**Execute** the concept of Gas analyser, pollution monitoring devices, instruments of power plant and industry.
CO	**MEPS301.4**	**Analyse** the concept of signal conditioning of input, various channel data acquisition system. The examine the concept of signal converter, data logger and supervisory control.
CO	**MEPS301.5**	**Assess** the detail content of data transmission system with time division multiplexing , pulse modulation and digital modulation.

PROGRAMME OUTCOMES (POs):

PO-1	Engineering Knowledge:	*Apply the knowledge or mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*
PO-2	Problem Analysis:	*Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principes of mathematics, natural sciences and engineering sciences.*
PO-3	Design / development of solutions:	*Design solutions for complex engineering problems and design system components or processes to meet the specifies needs with appropriate consideration for the public health and safety and the cultural , societal and environmental consideration.*
PO-4	Conduct investigations of complex problems:	*Use research based knowledge and research method including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
PO-5	Modern tools usage:	*create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitaions.*
PO-6	The engineer and society	*Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues and the consequent responsibilites relevant to the professional engineering practice.*
PO-7	Environment and sustainability:	*Understand the impact of the professional engineering solutions in societal an d environmental context and demonstrate the knowledge of and need for sustainable development.*

PO-8	Ethics:	*Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
PO-9	Individual and team work:	*Function effectively as an indicidual and as a member or leader in diverse teams and in multidisciplinary settings.*
PO-10	Communication:	*Communicate effectively on complex engineering activites with the engineering community and with society at large as, being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.*
PO-11	Project management and finance:	*Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
PO-12	Life-long learning:	*Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical power system.*
PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical power systems.*
PSO-3	*analyze, design, and implement control system instrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*
PSO-4	*Application project management, techniques and computations and to electrical power systems.*

MAPPING BETWEEN COs & POs

		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO	**MEPS301.1**	3	2	1	3	3	3	2	3	3	2	2	3
CO	**MEPS301.2**	3	2	3	2	3	3	3	3	2	3	2	3
CO	**MEPS301.3**	3	2	3	2	3	2	3	2	3	3	2	3
CO	**MEPS301.4**	3	2	3	2	3	2	2	2	3	3	2	2
CO	**MEPS301.5**	3	2	3	2	2	2	2	1	2	3	2	3
TOTAL		15	10	13	11	14	12	12	11	13	14	10	14
AVERAGE		3	2	3	2.2	3	2	2.4	2	2.6	3	2	2.8

ROUND UP AVG	3	2	3	3	3	3	3	3	3	3	2	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **##** OUT OF 180 OR **##**

MAPPING BETWEEN COs & PSOs

		PSO-1	**PSO-2**	**PSO-3**	**PSO-4**
CO	**MEPS301.1**	3	2	3	1
CO	**MEPS301.2**	1	3	3	2
CO	**MEPS301.3**	2	3	3	2
CO	**MEPS301.4**	1	3	3	2
CO	**MEPS301.5**	2	2	3	2
TOTAL		9	13	15	9
AVERAGE		1.8	2.6	3	1.8
ROUND UP AVG		2	3	3	2

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **46** OUT OF 60 OR **##**

POs, PSOs, PEOs, COs, COURSE OBJECTIVES, CO-PSOs & CO-POs MAPPING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

• To be able to apply knowledge of mathematics, science and engineering as appropriate in the field of electrical and electronics engineering practice to identify, understand, design, implement, evaluate and formulate solutions to meet industry and social needs.
• To analyze real life problems, design computing system appropriate to their solutions that are technically sound, economically feasible and sustainable.
• To use the latest techniques, skills and modern engineering tools necessary to analyze industrial problems related to electrical and electronics engineering in global, economics, environmental and social context.
• To have understanding of effects of the engineering solutions and to exhibit professionalism, ethical attitude, effective written and oral communication skills and team work to practice in their profession with high regards to social issues and responsibilities.

COURSE/SUBJECT NAME:	**Advanced Electrical Drives**						
COURSE CODE:	**MEPS-302**						
COURSE TYPE:	**THEORY**						
MARKS DISTRIBUTION:	**THEORY SLOT:**	END SEM.:	**70**	MID SEM. EXAM:	**20**	QUIZ ASSIGN. :	**10**
	PRACTICAL SLOT:	END SEM.:		TERM WORK:			
	TOTAL MARKS:	**##**					
CONTACT HOURS PER WEEK:	LECTURE:	**3**	TUTORIAL:	**1**	PRACTICAL:		
TOTAL CREDITS EARNED:	**4**						
COURSE COORDINATOR:							

COURSE CONTENT:

UNIT 1: Electrical Drives Introduction, Choice of Electrical Drives, Dynamics of Electrical Drives, Concept of Multi-quadrant operation, Components of load torques. Selection of motor power rating.

UNIT 2: D.C.Drive, speed torque, speed control. Starting, Breaking. Controlled rectified fed DC drive, chopper controlled dc drives. Close loop control of d.c. drive. Introduction of transient analysis.

UNIT 3:Induction Motor Drives : Three phase I.M., analysis and performance. Operation with unbalanced source voltages and single phasing, analysis of I.M. fed from Non-sinusoidal voltage supply. Starting, Breaking, Introduction of transient analysis. Speed control methods, single
phase I.M. Close loop control of I.M. Drives.

UNIT 4: Synchronous Motor Drives, cylindrical rotor wound field motor, salient pole wound field motor, synchronous reluctance motor, Hysterisis synchronous motor, operation from fixed frequency supply, starting, breaking, synchronous motor variable speed drives, starting large synchronous machines.

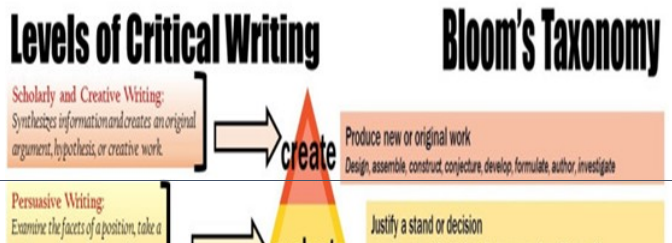
UNIT 5: Introduction of Brushless dc motor, stepper motor and switch reluctance motor drives, solar and battery powered drives, Traction Drives, Energy conservation in Electrical Drives.

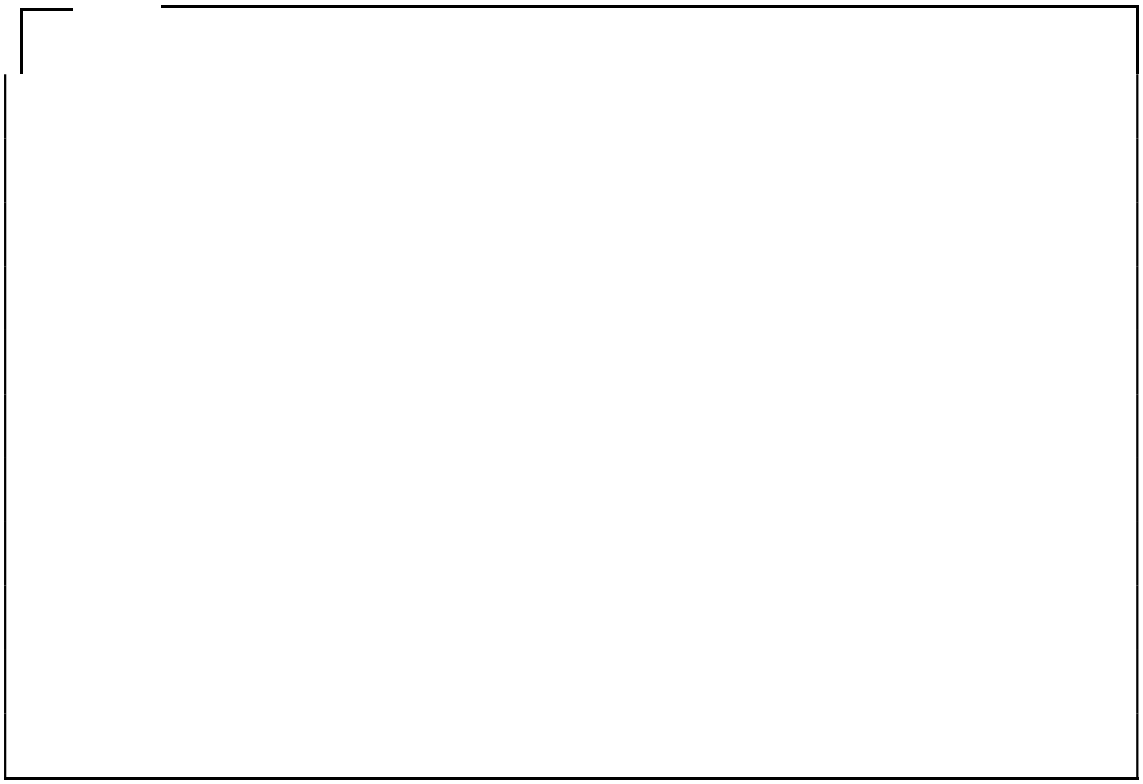
REFERENCES:

1 **Power semi conductor controlled drives by G.K.Dubey**

2 **Fundamentals of Electrical Drives by G.K.Dubey**

3 **Electrical Machine & Power Electronics by P.C.Sen**





COURSE OUTCOMES (COs) OF ADVANCED ELECTRICAL DRIVES (MEPS-302)

After a successful completion of the course, students will be able to:

CO	**MEPS302.1**	**Remember** the selection of electrical drive, concept of electrical drives dynamics and concept of operation of drives based on quadrant. List the component of load torques and selection of motor power rating.
CO	**MEPS302.2**	**Describe** the concept of controlling of DC electrical motor using various content such as speed control method, controlled rectifier fed DC drive, close loop control of DC drive and its transient analysis.
CO	**MEPS302.3**	**Execute** the concept of induction motor as a drive through its speed control, operation with unbalanced source, starting , breaking, transient behaviour and close loop control for single and three phase IM.
CO	**MEPS302.4**	**Analyse** the various aspects of synchronous motor drive by taking up the concept of starting, breaking, operation and speed control on all types of synchronous motor.
CO	**MEPS302.5**	**Assess** the important conceptual behaviour of electrical drives such as brushless dc motor, stepper motor, switched reluctance motor and solar/ battery powered drive.

PROGRAMME OUTCOMES (POs):

PO-1	Engineering Knowledge:	*Apply the knowledge or mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*

PO-2	Problem Analysis:	*Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principes of mathematics, natural sciences and engineering sciences.*
PO-3	Design / development of solutions:	*Design solutions for complex engineering problems and design system components or processes to meet the specifies needs with appropriate consideration for the public health and safety and the cultural , societal and environmental consideration.*
PO-4	Conduct investigations of complex problems:	*Use research based knowledge and research method including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.*
PO-5	Modern tools usage:	*create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitaions.*
PO-6	The engineer and society	*Apply reasoning informed by the contextual knowledge to assess societal , health, safety, legal and cultural issues and the consequent responsibilites relevant to the professional engineering practice.*
PO-7	Environment and sustainability:	*Understand the impact of the professional engineering solutions in societal an d environmental context and demonstrate the knowledge of and need for sustainable development.*
PO-8	Ethics:	*Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
PO-9	Individual and team work:	*Function effectively as an indicidual and as a member or leader in diverse teams and in multidisciplinary settings.*
PO-10	Communication:	*Communicate effectively on complex engineering activites with the engineering community and with society at large as, being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions.*
PO-11	Project management and finance:	*Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.*
PO-12	Life-long learning:	*Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.*

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-1	*Understand and apply the statistics/probability, transform methods, discrete mathematics, or applied differenial equations, etc. In support of electrical power system.*
PSO-2	*Demonstrate knowledge and hence on competence in the applications of circuit analysis and design , computer programming, associated software and applications , digital electronics, testing operation and maintenance of electrical power systems.*
PSO-3	*analyze, design, and implement control system instrumentation systems, communication systems, or power systems for electrical and electronics devices and machines.*

PSO-4	*Application project management, techniques and computations and to electrical power systems.*

MAPPING BETWEEN COs & POs

		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO	**MEPS302.1**	3	2	1	2	2	2	1	3	2	1	2	3
CO	**MEPS302.2**	3	3	2	2	2	1	1	3	3	1	2	3
CO	**MEPS302.3**	3	2	2	2	2	1	1	1	2	1	2	3
CO	**MEPS302.4**	3	1	2	1	2	1	1	1	2	1	1	2
CO	**MEPS302.5**	3	3	3	2	3	3	3	2	3	2	1	3
TOTAL		15	11	10	9	11	8	7	10	12	6	8	14
AVERAGE		3	2	2	2	2	1.6	1.4	2	2.4	1.2	1.6	2.8
ROUND UP AVG		3	3	2	2	3	2	2	2	3	2	2	3

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **###** OUT OF 180 OR **##**

MAPPING BETWEEN COs & PSOs

		PSO-1	PSO-2	PSO-3	PSO-4
CO	**MEPS302.1**	2	2	1	2
CO	**MEPS302.2**	2	1	2	1
CO	**MEPS302.3**	2	2	1	2
CO	**MEPS302.4**	2	2	1	2
CO	**MEPS302.5**	3	3	3	2
TOTAL		11	10	8	9
AVERAGE		2.2	2	1.6	2

ROUND UP AVG	3	2	2	2

Marks policy for each cell of above matrix:	3	Fully matched
	2	Partially matched
	1	Slightly matched
	0	No matched

SCORE= (MARKS OBTAINED / TOTAL MARKS) X 100 SCORE= **38** OUT OF 60 OR **#**

Department of Electronics & Communication Engineering

First Year

COURSE OUTCOMES for MEDC-101 (Advanced Mathematics)

Students should be able to

C101.1	Apply matrix theory in Communication Engineering problems
C101.2	Calculate gradients, derivatives and its applications
C101.3	Apply the constrained optimization for approximate solutions.
C101.4	Do statistical modeling and analysis of Communication Systems
C101.5	Apply Markovian process and distinguish the utility of queuing models

CO-PO: Mapping for MEDC-101 (Advanced Mathematics)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C101.1	2	2	2	1	1	2	-	-	-	-	-	3
C101.2	2	2	2	2	2	-	-	-	-	2	-	2
C101.3	3	2	-	1	-	2	-	2	-	-	-	3
C101.4	2	3	-	2	-	1	-	2	-	2	2	2
C101.5	2	2	2	-	2	2	-	2	2	-	1	2

COURSE OUTCOMES for MEDC-102(Micro controller system Design)

Students should be able to

C102.1	Compare general-purpose systems and embedded systems based on their
C102.2	Describe the components, peripherals and communication interfaces of an embedded
C102.3	Illustrate the development and debugging process of an embedded system.
C102.4	To understand architecture, features and need of ARM7& ARM CORTEX
C102.5	To understand architecture, features and external interfaces of ARM 9

CO-PO: Mapping for MEDC-102(Micro controller system Design)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C102.1	2	2	1	1	-	-	-	-	-	1	-	3
C102.2	2	2	1	1	-	-	-	-	-	1	-	3
C102.3	2	2	1	1	-	-	-	-	-	1	-	3
C102.4	2	3	1	1	-	-	-	-	-	1	-	3
C102.5	2	3	1	1	-	-	-	-	-	1	-	3

COURSE OUTCOMES for MEDC-103 DSP Application

Students should be able to

C103.1	To build advanced concepts in digital signal processing applicable for processing
C103.2	To enable the students to formulate and solve problems in Digital Systems design
C103.3	To design optimal filters using IIR and FIR filtering techniques
C103.4	To familiarize with Signal Modeling and development of recursion techniques.
C103.5	To acquaint the students with contemporary use and build DSP systems for real time

CO-PO: Mapping for MEDC-103 DSP Application

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C103.1	3	3	3	1	1	-	-	-	2	-	-	2
C103.2	3	1	3	1	1	-	-	-	2	-	-	2
C103.3	2	1	1	1	1	-	-	-	2	-	-	2
C103.4	3	2	1	1	1	-	-	-	2	-	-	2
C103.5	3	3	1	1	1	-	-	-	2	-	-	2

COURSE OUTCOMES for MEDC-104 (VLSI Design)

Students should be able to

C104.1	To understand VLSI design methodologies
C104.2	To give an insight to the students about the significance of CMOS technology and
C104.3	To introduce High speed VLSI techniques
C104.4	To teach the importance and architectural features of programmable logic devices
C104.5	To introduce the ASIC construction and design algorithms

CO-PO: Mapping for MEDC-104 (VLSI Design)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C104.1	2	3	-	-	-	-	-	-	-	-	-	1
C104.2	3	-	-	-	-	-	-	-	-	-	-	1
C104.3	2	2	3	-	2	-	-	-	-	-	-	-
C104.4	2	1	3	-	-	-	-	-	-	-	-	-
C104.5	2	2	3	-	3	-	-	-	-	-	-	2

COURSE OUTCOMES for MEDC-105(Data Communication and Computer network)

Students should be able to

C105.1	Build an understanding of the fundamental concepts of computer networking,
C105.2	Gain expertise in design, implement and analyze performance perspective of TCP/IP
C105.3	Identify and analyze the different types of network topologies, error and flow control mechanisms
C105.4	Compare various congestion control mechanisms and identify suitable Transport
C105.5	Illustrate the functionality of OSI and TCP/IP reference model

CO-PO: Mapping for MEDC-105(Data Communication and Computer network)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C105.1	-	2	1	-	2	3	-	-	-	2	2	2
C105.2	2	2	-	-	1	-	-	-	-	2	2	2
C105.3	2	1	-	-	1	-	-	-	-	2	-	-
C105.4	2	2	-	-	2	-	-	-	-	1	2	-
C105.5	-	2	-	2	-	3	-	-	-	2	2	2

COURSE OUTCOMES for MEDC-106(LAB-I)

Students should be able to

C106.1	Compare general-purpose systems and embedded systems based on their
C106.2	Describe the components, peripherals and communication interfaces of an embedded system
C106.3	Illustrate the development and debugging process of an embedded system.
C106.4	To understand architecture, features and need of ARM7& ARM CORTEX
C106.5	To understand architecture, features and external interfaces of ARM 9

CO-PO: Mapping for MEDC-106(LAB-I)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C106.1	3	3	3	3	3	3	-	-	2	-	-	2
C106.2	3	3	1	3	1	3	-	-	2	-	-	2
C106.3	2	3	1	1	1	2	-	-	1	-	-	2
C106.4	3	2	3	1	1	3	-	-	2	-	-	2
C106.5	3	3	3	1	1	3	-	-	2	-	-	2

COURSE OUTCOMES for MEDC-107(LAB-II)

Students should be able to

C107.1	To understand VLSI design methodologies
C107.2	To give an insight to the students about the significance of CMOS technology and
C107.3	To introduce High speed VLSI techniques
C107.4	To teach the importance and architectural features of programmable logic devices
C107.5	To introduce the ASIC construction and design algorithms

CO-PO: Mapping for MEDC-107(LAB-II)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C107.1	3	3	3	3	3	3	1	2	2	1	2	2
C107.2	3	3	3	3	3	2	1	1	2	1	2	2
C107.3	2	3	3	3	3	3	1	1	2	1	2	2
C107.4	3	2	3	3	3	2	1	-	2	2	1	2
C107.5	3	3	3	3	3	2	-	-	2	2	1	2

COURSE OUTCOMES for MEDC-201(System Programming)

Students should be able to

C201.1	Define the basics Fundamental of programming, steps in problem solving with
C201.2	Understand different data types and their operations
C201.3	Analyze, compare and understand shorting and searching algorithm
C201.4	Understand basic system programming like Assembler, interpreter etc
C201.5	Explain the concept of pointer and its applications

CO-PO: Mapping for MEDC-201(System Programming)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C201.1	3	2	2	1	1	2	-	-	-	-	-	3
C201.2	2	2	2	-	2	-	-	-	-	1	-	2
C201.3	3	2	1	-	-	2	-	2	1	-	-	-
C201.4	3	3	-	-	-	1	-	2	-	2	2	-
C201.5	2	2	2	-	2	2	-	2	2	-	1	-

COURSE OUTCOMES for MEDC-202(Modeling & Simulation of Computer)

Students should be able to

C202.1	Define the basics of simulation modeling and replicating the practical situations in organizations
C202.2	Generate random numbers and random variates using different techniques.
C202.3	Develop simulation model using heuristic methods.
C202.4	Analysis of Simulation models using input analyzer, and output analyzer
C202.5	Explain Verification and Validation of simulation mode

CO-PO: Mapping for MEDC-202 (Modeling & Simulation of Computer)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C202.1	3	1	2	1	-	-	-	-	-	1	-	3
C202.2	1	2	2	-	1	-	-	-	-	-	-	3
C202.3	-	-	3	2	1	-	-	-	-	1	-	3
C202.4	-	3	2	-	1	-	-	-	-	1	-	3
C202.5	1	-	3	-	1	-	-	-	-	1	-	3

COURSE OUTCOMES for MEDC-203(Network Design Technology)

Students should be able to

C203.1	Comprehend and analyze OSI Security Architecture and Symmetric Key Encryption
C203.2	Comprehend the various mathematic techniques in cryptography including number
C203.3	Analyze block ciphers, Data Encryption Standard (DES), Advanced Encryption
C203.4	Understand the different types of network security protocols and its standards
C203.5	Know the various network security mechanisms

CO-PO: Mapping for MEDC-203(Network Design Technology)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C203.1	3	3	3	3	3	1	1	-	2	2	1	2
C203.2	3	3	3	3	3	1	1	1	2	2	1	2
C203.3	2	3	3	3	3	1	-	1	2	1	2	2
C203.4	3	2	3	3	3	1	-	1	2	2	2	2
C203.5	3	3	3	3	3	1	-	-	2	1	1	2

COURSE OUTCOMES for MEDC-204(Optical Network)

Students should be able to

C204.1	Apply the active, passive devices and optical amplifiers in optical networks.
C204.2	Understand how nonlinear effects like SRS, SBS, SPM, XPM, FWM and Solitons can be used in optical fiber communications
C204.3	Explain the difference between modulators like Electro optic and Acousto optic
C204.4	Determine Power and Rise time budgets and understand the different topologies of optical networks, WDM technology, CDMA and SCM
C204.5	Design, analyze and evaluate fiber optical communication links

CO-PO: Mapping for MEDC-204(Optical Network)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C204.1	2	1	-	-	-	-	-	-	-	2	-	1
C204.2	3	2	2	-	-	-	-	-	-	2	-	1
C204.3	3	2	2	-	-	-	-	-	-	2	-	-
C204.4	2	1	-	-	-	-	-	-	-	2	-	-
C204.5	2	1	-	-	3	-	-	3	-	2	-	2

COURSE OUTCOMES for MEDC-205(Mobile & Satellite Communication)

Students should be able to

C205.1	Design appropriate mobile communication systems.
C205.2	Apply frequency-reuse concept in mobile communications, and to analyze its effects
C205.3	Distinguish various multiple-access techniques for mobile communications e.g. FDMA
C205.4	Analyze path loss and interference for wireless telephony and their influences on a mobilecommunication system's performance.
C205.5	Channel details, advantages and disadvantages of using the technology

CO-PO: Mapping for MEDC-205(Mobile & Satellite Communication)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C205.1	3	2	2	1	2	3	1	-	-	2	2	2
C205.2	3	3	3	-	1	-	-	1	1	-	2	2
C205.3	3	3	1	1	1	1	1	-	1	-	-	-
C205.4	2	3	2	1	2	1	1	-	1	-	2	-
C205.5	3	3	1	2	-	3	-	-	-	2	2	2

COURSE OUTCOMES for MEDC-206(LAB-III)

Students should be able to

C206.1	Define the basics Fundamental of programming, steps in problem solving with
C206.2	Understand different data types and their operations
C206.3	Analyse, compare and understand shorting and searching algorithem
C206.4	Understand basic system programming like Assembler, interpreter etc
C206.5	Explain the concept of pointer and its applications

CO-PO: Mapping for MEDC-206(LAB-III)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C206.1	2	3	2	2	2	1	-	-	2	-	1	2
C206.2	3	3	2	3	3	-	-	-	2	-	1	2
C206.3	2	3	2	3	3	-	-	1	2	-	-	2
C206.4	2	2	3	2	3	-	-	1	2	-	-	2
C206.5	3	3	3	3	3	-	-	-	2	-	-	2

COURSE OUTCOMES for MEDC-207(LAB-IV)

Students should be able to

C207.1	Define the basics of simulation modeling and replicating the practical situations in
C207.2	Generate random numbers and random variates using different techniques.
C207.3	Develop simulation model using heuristic methods.
C207.4	Analysis of Simulation models using input analyzer, and output analyzer
C207.5	Explain Verification and Validation of simulation mode

CO-PO: Mapping for MEDC-207(LAB-IV)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C207.1	2	3	-	1	-	2	-	1	-	1	2	1
C207.2	3	-	-	1	-	2	-	1	-	1	1	1
C207.3	2	2	3	-	2	2	-	1	-	1	1	-
C207.4	2	1	3	-	-	3	-	1	-	1	-	-
C207.5	2	2	3	-	3	3	-	-	-	-	-	2

Second Year

COURSE OUTCOMES for MEDC-301(Information Theory & Coding)

Students should be able to

C301.1	Students will be able to Characterize and apply probabilistic techniques in modern digital communication systems, such as information systems, receivers, filtering and statistical operations
C301.2	Comparatively evolve key results developed in this course for applications to signal
C301.3	Develop frameworks based in error coding and modulating techniques
C301.4	Apply different channel coding techniques for error detection and correction schemes
C301.5	Apply lossless source codes for discrete memory less source to improve the efficiency of information.

CO-PO: Mapping for MEDC-301(Information Theory & Coding)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C301.1	3	3	2	1	-	1	2	-	-	-	-	3
C301.2	2	2	2	2	-	-	-	-	-	1	-	2
C301.3	3	2	1	1	-	1	-	-	1	-	-	3
C301.4	3	1	1	2	-	1	2	-	-	2	2	2
C301.5	2	2	1	-	-	-	-	2	2	-	1	2

COURSE OUTCOMES for MEDC-302(Advanced Digital Communication)
Students should be able to

C302.1	Design matched filter for detection of digital signals in the presence of white
C302.2	Design waveforms to overcome ISI in band-limited channels.
C302.3	Design equalization circuits to overcome the effect of channel distortion
C302.4	Compute probability of error for binary digital modulation schemes in the presence
C302.5	Use MATLAB and Simulink to experiment and experience the above digital modulation concepts

CO-PO: Mapping for MEDC-302(Advanced Digital Communication)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C302.1	3	1	2	1	-	-	-	-	-	1	-	3
C302.2	1	2	2	-	1	-	-	-	-	-	-	3
C302.3	-	-	3	2	1	-	-	-	-	1	-	3
C302.4	-	3	2	-	1	-	-	-	-	1	-	3
C302.5	1	-	3	-	1	-	-	-	-	1	-	3

COURSE OUTCOMES for MEDC-303 (Seminar)

Students should be able to

C303.1	Understand the concepts of Digital Communication.
C303.2	Analyze the analytical model.
C303.3	Apply the report writing skills
C303.4	Develop communication skills and teamwork
C303.5	Practice in utilizing quality information through various resources

CO-PO: Mapping for MEDC-303 (Seminar)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C303.1	-	1	-	-	-	-	3	1	-	-	-	2
C303.2	-	3	-	-	-	-	-	-	-	-	-	-
C303.3	-	3	-	2	-	-	-	-	-	-	-	-
C303.4	-	-	-	-	-	-	-	-	-	-	3	-
C303.5	-	-	1	1	-	1	-	1	3	1	1	1

COURSE OUTCOMES for MEDC-304 (Dissertation part I)
Students should be able to

C304.1	Individual projects can be taken up
C304.2	Involve in literature survey in the chosen field
C304.3	Use Science/Engineering principles to solve identified issues
C304.4	Adopt relevant and well-defined / innovative methodologies to fulfill the specified
C304.5	Submission of scientific report in a specified format (after plagiarism check)

CO-PO: Mapping for MEDC-304 (Dissertation part I)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C304.1	2	3	1	-	-	-	-	-	-	-	1	2
C304.2	3	2	2	-	-	-	-	-	-	-	1	3
C304.3	2	2	3	-	2	-	-	-	-	-	-	2
C304.4	2	1	3	-	-	-	-	-	-	-	-	2
C304.5	2	2	3	-	3	-	-	-	-	-	-	2

COURSE OUTCOMES for MEDC-401(Dissertation part II)

Students should be able to

C401.1	Formulate specific problem statements for ill-defined real life problems with reasonable assumptions and constraints
C401.2	Perform literature search and / or patent search in the area of interest
C401.3	Conduct experiments / Design and Analysis / solution iterations and document the
C401.4	Synthesize the results and arrive at scientific conclusions / products / solution
C401.5	Document the results in the form of technical report / presentation

CO-PO: Mapping for MEDC-401(Dissertation part II)

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C401.1	2	3	2	-	-	-	-	-	-	-	1	2
C401.2	3	3	2	-	-	-	-	-	-	-	1	3
C401.3	3	2	3	-	2	-	-	-	-	-	-	2
C401.4	2	1	3	-	-	-	-	-	-	-	-	2
C401.5	2	2	3	-	3	-	-	-	-	-	-	2

Department of Computer Science & Engineering

M.TECH CSE First Year

MCSE-101 ADVANCED COMPUTATIONAL MATHEMATICS

Upon successful completion of this course the students will be able to :

CO101.1	Introduce a scientific programming language and present its features.
CO101.2	Deal with the language commands such as computation, graphs, functions and loops.
CO101.3	Use a programming language to solve mathematical problems.
CO101.4	Build computational models to deal with scientific application
CO101.5	Write scientific researches using Latex or Scientific Workplace.

CO-PO: MCSE-101 ADVANCED COMPUTATIONAL MATHEMATICS

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO101.1	3	3	3	3	-	1	-	1	2	1	-	3
CO101.2	3	3	3	3	-	1	-	-	2	1	-	3
CO101.3	3	2	3	3	-	1	-	-	1	1	1	3
CO101.4	3	3	3	3	-	1	-	1	2	1	-	3
CO101.5	3	3	3	3	1	1	-	-	2	1	1	3
CO101.6	3	3	3	3	1	1	-	-	2	1	-	3
	3	**3**	**3**	**3**	**1**	**1**	**-**	**1**	**2**	**1**	**1**	**3**

CO-PSO MCSE-101 ADVANCED COMPUTATIONAL MATHEMATICS

PSO CO	PSO1	PSO2	PSO3	PSO4
CO101.1	-	-	2	2
CO101.2	-	-	2	2
CO101.3	-	-	2	2
CO101.4	-	1	2	2
CO101.5	-	-	2	2
CO101.6	-	-	2	2
	0	**1**	**2**	**2**

MCSE-102 ADVANCED DATA STRUCTURES AND ALGORITHM

Upon successful completion of this course the students will be able to:

CO102.1	For a given search problem (linear search and binary search) student will be able to implement it
CO102.2	For a given problem of stacks, queues and link lists, students will be able to implement it and analyze the same to determine the time and computation complexity
CO102.3	Students will be able to write an algorithm for selection sort, insertion sort, quick sort, merge sort, heap sort, bubble sort and compare their performance
CO102.4	Students will be able to implement tree, graph search and traversal algorithms
CO102.5	Demonstrate various tree traversal methods.

CO-PO: Mapping for MCSE-102 advanced data structures and algorithm

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO102.1	3	3	1	-	-	-	-	-	2	-	2	3
CO102.2	3	-	3	-	-	2	-	-	2	-	-	3
CO102.3	3	1	3	2	-	-	-	1	2	-	-	3
CO102.4	3	1	1	2	-	1	-	-	2	2	2	3

CO102.5	3	2	1	-	2	-	-	-	2	2	-	3
CO102.6	3	1	1	2	2	-	-	1	2	-	-	3
	3	**2**	**2**	**2**	**2**	**2**	**-**	**1**	**2**	**2**	**2**	**3**

CO-PSO Mapping for MCSE-102 advanced data structures and algorithm

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO102.1	3	2	3	-
CO102.2	3	2	3	-
CO102.3	3	2	2	-
CO102.4	3	2	3	3
CO102.5	3	2	3	3
CO102.6	3	2	2	-
	3	**2**	**3**	**3**

MCSE-103 ADVANCED COMPUTOR ARCHITECTUR

Upon successful completion of this course the students will be able to :

CO103.1	State principles of parallel computer design and compute system performance
CO130.2	Classify instruction set architectures and modern architectures such as RISC, Super Scalar, VLIW architecture.
CO103.3	Design collision free scheduling for pipeline processors.
CO103.4	Show Vector processing and vector instructions.
CO103.5	Demonstrate shared memory and distributed memory model.
CO103.6	Compare various parallel programming models , environments and its features.

CO-PO: Mapping for MCSE-103 Advanced Computer Architecture

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO103.1	3	2	3	3	-	2	3	-	-	1	-	3
CO103.2	3	1	-	2	1	2	3	-	-	1	-	-
CO103.3	3	3	3	3	-	2	2	-	-	1	-	-
CO103.4	3	2	-	2	-	1	3	-	-	1	-	-
CO103.5	3	2	2	3	-	2	3	-	-	1	-	3

CO103.6	3	2	2	3	1	1	3	-	-	1	-	2
	3	**2**	**2**	**3**	**1**	**3**	**3**	**-**	**-**	**1**	**-**	**2**

CO-PSO Mapping for MCSE-103 Advanced Computer Architecture

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO103.1	-	-	2	2
CO103.2	-	-	2	2
CO103.3	-	2	2	2
CO103.4	-	-	1	2
CO103.5	-	2	3	2
CO103.6	-	2	2	2
	0	**2**	**2**	**2**

MCSE-104 OBJECT ORIENTED TECHNOLOGY

Upon successful completion of this course the students will be able to :

CO104.1	Implement encapsulation, abstraction of object oriented technology
CO104.2	Explain classes, their relationships and associativity of objects with classes.
CO104.3	Discuss various object oriented features like polymorphism, inheritance and abstract methods with example.
CO104.4	Perform operations with container classes and templates.
CO104.5	Perform the file operations with the help of various class libraries.
CO104.6	Summarize benefits of OOP Languages over conventional languages.

CO-PO: Mapping for MCSE-104 Object Oriented Technology

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO104.1	3	3	3	2	1	2	2	-	2	1	2	3
CO104.2	3	3	3	1	2	2	2	-	2	1	2	3
CO104.3	3	3	3	2	1	2	2	-	2	1	2	3
CO104.4	3	3	3	2	2	2	2	-	2	1	1	3
CO104.5	3	3	3	1	1	2	2	-	2	1	1	3

CO104.6	3	3	3	2	1	2	2	-	2	1	1	3
	3	**3**	**3**	**2**	**1**	**2**	**2**	**-**	**2**	**1.5**	**2**	**3**

CO-PSO Mapping for MCSE-104 object oriented technology

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO104.1	1	3	2	2
CO104.2	1	3	2	2
CO104.3	1	3	2	2
CO104.4	1	3	2	2
CO104.5	1	3	2	2
CO104.6	1	3	2	2
	1	**3**	**2**	**2**

MCSE-105 ADVANCED COMPUTER NETWORKING

Upon successful completion of this course the students will be able to :

CO105.1	Have a good understanding of the OSI Reference Model and its Layers
CO105.2	Identify core networking and infrastructure components and the roles they serve; and given requirements and constraints, design an IT infrastructure including devices, topologies, protocols, systems software, management and security;
CO105.3	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
CO105.4	Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols
CO105.5	Discuss various security mechanisms in data transmission

CO-PO: Mapping for MCSE-105 Advanced Computer Network

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO105.1	3	3	3	-	2	2	1	-	1	-	2	3

C0105.2	3	3	3	-	2	1	1	-	1	-	-	3
CO105.3	3	3	3	2	2	2	1	-	1	1	-	3
CO105.4	3	3	3	-	2	1	1	-	1	1	2	3
CO105.5	3	3	3	2	3	1	1	2	1	1	2	3
CO105.6	3	-	-	2	2	2	1	2	1	1	2	3
	3	**3**	**3**	**2**	**2**	**1.5**	**1**	**2**	**1**	**1**	**2**	**3**

CO-PSO Mapping for MCSE-105 Advanced Computer Network

PSO **CO**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO105.1	3	2	2	2
CS105.2	3	2	2	2
CO105.3	3	2	2	2
CO105.4	3	2	2	2
CO105.5	3	2	2	2
CO105.6	3	2	2	2
	3	**2**	**2**	**2**

MCSE 201 - Web Technology and Commerce

Students should be able to

CO201.1	Analyse web servers with their features and characteristics.
CO201.2	Apply web design issues for web publishing
CO201.3	Develop web elements using web technologies HTML and DHTML.
CO201.4	Use CSS and XML for static and dynamic web development.
CO201.5	differentiate e-commerce models B2B,B2C and C2C.
	Demonstrate security issues in e-payment system.

CO-PO: Mapping for MCSE 201 - Web Technology and Commerce

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO201.1	3	2	-	-	2	-	-	-	2	-	2	2
CO201.2	3	3	3	1	2	2	1	3	2	-	2	2
CO201.3	3	3	3	1	2	2	-	2	2	-	2	3
CO201.4	3	-	3	2	3	2	-	2	2	-	2	3
CO201.5	3	2	-	1	3	3	1	3	2	-	2	3
CO201.6	3	3	-	1	3	3	1	3	-	-	2	3
	3	**3**	**3**	**1**	**3**	**2**	**1**	**3**	**2**	**-**	**2**	**3**

CO-PSO Mapping for MCSE 201 - Web Technology and Commerce

PSO CO	PSO1	PSO2	PSO3	PSO4
CO201.1	-	1	3	2
CO201.2	-	1	3	-
CO201.3	-	1	3	-
CO201.4	-	1	3	3
CO201.5	-	1	3	2
CO201.6	-	-	3	2
	0	**1**	**3**	**2**

MCSE- 202 Information theory, coding and cryptography

Students should be able to

CO202.1	Understanding of the basics of Cryptography and Network Security and working knowledge of Mathematics used in Cryptology.
CO202.2	Understanding of previous attacks on cryptosystems to prevent future attacks from securing
CO202.3	Knowledge about how to maintain the Confidentiality, Integrity and Availability
CO202.4	Understanding of various protocols for network security to protect
CO202.5	Getting hands-on experience of various Information Security Tools..

CO-PO: Mapping for MCSE- 202 Information theory, coding and cryptography

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO202.1	3	2	2	1	2	2	-	3	-	-	-	3
CO202.2	3	2	2	1	2	2	-	3	-	-	-	3
CO202.3	3	2	2	1	2	2	-	3	-	-	-	3
CO202.4	3	2	2	1	2	2	-	3	-	-	-	3
CO202.5	3	2	2	1	2	2	-	3	-	-	1	3
	3	**2**	**2**	**1**	**2**	**2**	**-**	**3**	**-**	**-**	**1**	**3**

MCSE- 203 Advanced Concepts in Data Bases

Students should be able to

CO203.1	Explain various Data Models with their merits and demerits.
CO203.2	Construct SQL queries using various data manipulation statements.
CO203.3	Apply normalization up to 3NF on given relations.
CO203.4	Summarize concurrency control mechanism for database transactions
CO203.5	Utilize triggers and cursors in PL/SQL programming.
CO203.6	Compare among distributed, multimedia and temporal databases.

CO-PO: Mapping for MCSE- 203 Advanced Concepts in Data Bases

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO203.1	3	2	-	-	-	-	-	-	1	1	2	2

CO203.2	3	-	3	-	-	-	-	-	1	-	-	2
CO203.3	3	2	2	-	-	-	-	-	1	-	2	2
CO203.4	3	2	-	3	3	3	-	-	1	1	-	2
CO203.5	3	-	3	3	-	-	-	-	1	-	-	2
CO203.6	3	3	-	2	3	3	-	-	1	1	2	2
	3	**2**	**3**	**2**	**3**	**3**	**-**	**-**	**1**	**1**	**2**	**2**

CO-PSO Mapping for MCSE- 203 Advanced Concepts in Data Bases

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO203.1	3	-	2	1
CO203.2	3	3	2	-
CO203.3	3	3	2	2
CO203.4	3	-	3	-
CO203.5	3	3	3	-
CO203.6	3	-	3	2
	3	**3**	**3**	**2**

MCSE- 204 System Programming

Students should be able to

CO204.1	Implement installation process for Unix/Linux
CO204.2	Execute basic commands of Linux OS.
CO204.3	Analyze process states, process scheduling and scheduling priorities.
CO204.4	Implement file creation, file modification and file access permissions
CO204.5	Execute basic Shell Programming assignments
CO204.6	Compare File Access and security mechanism in Linux and Windows

CO-PO: Mapping for MCSE- 204 System Programming

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO204.1	3	2	3	-	2	-	-	1	1	1	1	3
CO204.2	3	3	3	-	2	-	2	1	1	2	1	3

CO204.3	3	3	2	-	-	-	-	1	-	1	3	3
CO204.4	3	2	3	-	2	-	-	1	3	2	2	3
CO204.5	3	2	3	-	2	-	2	1	1	2	2	3
CO204.6	3	3	1	-	3	-	-	1	-	1	1	-
	3	**2**	**2**	**-**	**2**	**-**	**2**	**1**	**1**	**2**	**2**	**3**

CO-PSO Mapping for MCSE- 204 System Programming

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO204.1	3	3	2	1
CO204.2	3	3	2	2
CO204.3	3	3	1	1
CO204.4	3	3	2	2
CO204.5	3	3	2	2
CO204.6	3	3	2	1
	3	**3**	**2**	**1**

MCSE- 205 Soft Computing

Students should be able to

CO205.1	Compare artificial intelligence techniques A*, Best First Search, Hill climbing.
CO205.2	Discuss types of learning and back propagation mechanism.
CO205.3	Analyse standard neural networks ART, Boltzmann machine.
CO205.4	Compare fuzzy logic approach with traditional mathematical approach and demonstrate the fuzzy set application.
CO205.5	Discuss evolutionary based algorithms and genetic algorithm modules
CO205.6	Summarize techniques to solve hard complex problems.

CO-PO: Mapping for MCSE- 205 Soft Computing

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO205.1	3	2	3	3	2	2	-	-	2	1	2	3
CO205.2	3	2	3	3	3	2	-	-	1	1	1	3

CO205.3	3	2	3	3	3	2	-	-	2	1	1	3
CO205.4	3	2	3	3	3	2	-	-	1	1	2	3
CO205.5	3	2	3	3	3	2	-	-	2	1	2	3
CO205.6	3	2	2	2	2	2	-	-	1	1	2	3
	3	**2**	**3**	**2**	**3**	**2**	**-**	**-**	**2**	**1**	**2**	**3**

CO-PSO Mapping for MCSE- 205 Soft Computing

PSO **CO**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO205.1	-	1	1	2
CO205.2	-	1	1	2
CO205.3	-	1	1	2
CO205.4	-	1	2	2
CO205.5	-	1	2	2
CO205.6	-	1	1	2
	0	**1**	**2**	**2**

Second Year

MCSE 301 (A) – Data Warehousing & Mining

Students should be able to

CO301.1	Understand the functionality of the various data mining and data warehousing component
CO301.2	Appreciate the strengths and limitations of various data mining and data warehousing models
CO301.3	Explain the analyzing techniques of various data
CO301.4	Describe different methodologies used in data mining and data ware housing.
CO301.5	Compare different approaches of data ware housing and data mining with various technologies

CO-PO: Mapping for MCSE 301 (A) – Data Warehousing & Mining

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO301.1	3	3	-	-	-	-	-	-	-	-	-	-
CO301.2	-	2	-	-	-	-	-	-	-	-	-	-
CO301.3	-	-	2	3	-	-	-	-	-	-	-	-
CO301.4	-	-	-	3	-	-	-	-	-	-	-	2
CO301.5	2	2	-	-	-	-	-	-	-	-	-	-
	2.5	**2.5**	**2**	**3**	**0**	**-**	**-**	**-**	**-**	**-**	**-**	2

CO-PSO Mapping for MCSE 301 (A) – Data Warehousing & Mining

PSO CO	PSO1	PSO2	PSO3	PSO4
CO301.1	2	2		2
CO301.2	-	2	2	
CO301.3	2	-		2
CO301.4	3		3	
CO301.5	-	2		2
	3.5	**3**	**2.5**	3

MCSE 302 (A) – Network Security

Students should be able to

CO302.1	Analyse network security principles and services.
CO302.2	Analyse cryptography with its various techniques
CO302.3	Demonstrate digital signature with its component.
CO302.4	Demonstrate characteristics and working of viruses.
CO302.5	Analyse types and design principle for firewall.
CO302.6	Analyse security techniques for data and information

CO-PO: Mapping for MCSE 302 (A) – Network Security

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO302.1	3	2	2	1	2	2	-	3	-	-	-	3

CO302.2	3	2	2	1	2	2	-	3	-	-	-	3
CO302.3	3	2	2	1	2	2	-	3	-	-	-	3
CO302.4	3	2	2	1	2	2	-	3	-	-	-	3
CO302.5	3	2	2	1	2	2	-	3	-	-	1	3
CO302.6	3	2	-	-	2	2	-	3	-	-	1	3
	3	**2**	**2**	**1**	**2**	**2**	**-**	**3**	**-**	**-**	**1**	**3**

CO-PSO Mapping for MCSE 302 (A) – Network Security

PSO CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO302.1	1	1	3	2
CO302.2	1	1	3	2
CO302.3	1	1	3	2
CO302.4	1	1	3	2
CO302.5	1	1	3	2
CO302.6	1	1	3	2
	1	**1**	**3**	**2**

MCSE- 302 (B) Simulations and Modeling

CO302.1	Develop mathematical models for engineering systems in different domains and derive analogies
CO302.2	Analyze first and second order linear and nonlinear systems in time and frequency domain
CO302.3	Perform system identification for linear time invariant systems
CO302.4	Simulate mathematical models of engineering systems using simulation software.
CO302.5	

CO-PO: Mapping for MCSE- 302 (B) Simulations and Modeling

PO CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO302.1	3	3	2	-	2		-		-	-	-	1
CO302.2	3	3	1		2		-		-	-	-	1
CO302.3	3	3	1	-	2	-	-	-	-	-	-	1

CO302.4	3	3	2	-	2	-	-	-	-	-	-	1
CO302.5	3	2	2	-	2	-	-	-	-	-	1	1
	3	**2.8**	**1.6**	**0**	**2**	**-**	**-**		**-**	**-**	**1**	**1**

Department of Master in Business Administration

First Year

LNCTE ,Bhopal-MBA		
ACADEMIC YEAR 2021-22		
1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**	
2. Name of Faculty: Mr. Sachin Gharwal	**6. Class: Ist Semester**	
3. Designation: Asst .Professor	**7. Subject: Management Concept and Practices CP-101**	
4. Contact No: , Email:	**8. Total No. of periods: 45**	
course outcome	**Level of Bloom's Taxonomy**	**Program outcome**
CO-101.1 Evaluate the global context for taking managerial actions of planning, organizing and controlling.	**L5**	PO-06
C0-101.2Analyse management principles into management practices.	**L4**	**PO-01**
CP-101.3Examine and access global Environment , including opportunities and threats and plaining that will impact management of an organization	**L4**	**PO-02/PO-06**
CP-101.4-Determine the most effective organisational design to take in specific situations.	**L6**	**PO-08**
CP-102.5- Evaluate approaches to controlling issues of effective Management.	**L5**	**PO-07**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .

PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE ,Bhopal-MBA			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty: Dr. Bhavana Likhitkar		**6. Class: Ist Semester**	
3. Designation: Associate Professor		**7. Subject: Quantitative Methods CP-102**	
4. Contact No: 9685614340, Email: Bhavanal@lnct.ac.in		**8. Total No. of periods: 45**	
course outcome		**Level of Bloom's Taxonomy**	**Program outcome**
CP-102.1	**Student will apply a professional knowledge of basic mathematical and statistical techniques needed for Research Problems.**	**L3**	PO-06
CP-102.2	**Students will able to solve critical/complex business problem with the help quantitative Measures.**	**L3**	**PO-02/PO-06**
CP-102.3	**Students will able to Evaluate statistical tools and techniques and give correrective messures at the time of uncertainity.**	**L5**	**PO-07**
CP-102.4	**Examine the direction and strength of a correlation between two or more factors.**	**L4**	**PO-02**
CP-102.5	**Students will able to Design research questioniour can be answered by quantitative measures**	**L6**	**PO-07**
Programme Out come			

PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

Faculty of Management & Commerce - LNCT, Bhopal

ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty: Dr Priti Dubey		**6. Class: Ist Semester**	
3. Designation: Associate Professor		**7. Subject: Managerial Economics CP-103**	
4. Contact No: 9826093354; Email: pritid@lnctu.ac.in		**8. Total No. of periods: 42**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
CP-103.1	**Student will be able to apply the concept of managerial economics and its application in decision making**	**L3**	**PO-01**
CP-103.2	**Student will be able to analyze cost, profit maximization and sales maximization**	**L4**	**PO-02**
CP-103.3	**Student will be able to examine the market structure under the prize distribution and price output decisions**	**L4**	**PO-04**

CP-103.4	**Student will be able to judge the macroeconomics aggregates and concepts of GDP GNP for calculating national income**	**L5**	**PO-07**
CP-103.5	**Student will be able to Execute importants money supply and monetary policy fiscal policy measures**	**L3**	**PO-07**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

Faculty of Management & Commerce - LNCT, Bhopal

ACADEMIC YEAR 2021-22	
1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**
2. Name of Faculty: Deeksha Dange	**6. Class: Ist Semester**
3. Designation: Assistant Professor	**7. Subject: Communication Skills-CP:104**
4. Contact No: 7415167629; Email: deekshad@lnct.ac.in	**8. Total No. of periods: 38**

CO	Course Outcome	Level of Bloom's Taxonomy	Program outcome
CP-104.1	**Student will be able to analyse communication and its Barriers/Hurdles of Communication**	**L4**	**PO-01**
CP-104.2	**Student will be able to design the their there resume and present their strength and weekness in formal way.**	**L6**	**PO-07**
CP-104.3	**Student will be able executing Concepts of Speaking Skills and listening skills Present and ready to develop himself for corporate world**	**L3**	**PO-01**
CP-104.4	**Student will be able to connect its non verbal communication and learn new skills for future growth.**	**L4**	**PO-04**
CP-104.5	**Student will be able to design profession documentation in proper formates.**	**L6**	**PO-07**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

Faculty of Management & Commerce - LNCT, Bhopal	
ACADEMIC YEAR 2021-22	
1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**
2. Name of Faculty: Dr. Manoj Sharma	**6. Class: Ist Semester**
3. Designation: Assistant Professor	**7. Subject: International Business Environment – CP 105**
4. Contact No: 9893365400; Email: manojs@lnctu.ac.in	**8. Total No. of periods: 34**

CO	Course Outcome	Level of Bloom's Taxonomy	Program outcome
CP-105.1	**Student will be able to examine the global business environment in terms of economic, social and cultural aspects.**	**L4**	**PO-02**
CP-105.2	**Student will be able to execute the concepts in international business with respect to foreign trade/international business.**	**L3**	**PO-07**
CP-105.3	**Student will be able to Analyze the exange rate and foreign investment for international business and strategies to be adopted by firms to expand globally.**	**L4**	**PO-04**
CP-105.4	**Student will be able to Evaluate the concept in international business with functioning of global trade.**	**L5**	**PO-07**
CP-105.5	**Student will be able to demostrate concepts and facts of globalization with social responsibility and international business**	**L3**	**PO-06**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

Faculty of Management & Commerce - LNCT, Bhopal			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty: Dr. Arvind Singh		**6. Class: Ist Semester**	
3. Designation: Professor		**7. Subject: Accounting for Managers – CP 106**	
4. Contact No: ; Email:		**8. Total No. of periods: 47**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
CP-106.1	**Student will be able to Execute financial accounting concepts its importance and scope with principles of double entry ledger, accounting and preparation of trial balance**	**L3**	**P0-01**
CP-106.2	**Student will be able to solve the complex financial statement of company and the concept of depreciation accounting I will studied**	**L3**	**P0-06**
CP-106.3	**Student will be able to Analyse the financial statement analysis under comparative statement, common size statement, ratio analysis and the basic concept of cash flow and fund flow analysis**	**L4**	**P0-04**
CP-106.4	**Student will be able to Compare the Management Accounting in this concepts needs, importance and Basic concept of budget, budgetary control and zero based budgeting will under studied**	**L4**	**P0-04**
CP-106.5	**Student will be able to evaluate the basis cost accounting in which records and process type of cost,cost sheet Basic concept of standard costing and variance analysis will understand**	**L5**	**P0-07**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.

PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE ,Bhopal-MBA			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty: Mr. Sachin Gharwal		**6. Class: II Semester**	
3. Designation: Asst .Professor		**7. Subject: Organisational Behaviour CP-201**	
4. Contact No: , Email:		**8. Total No. of periods: 45**	
course outcome		**Level of Bloom's Taxonomy**	**Program outcome**
CP-202.1	**Students will be able to analyze various levels of studying organization behaviour**	L4	PO-02
CP-202.2	Students will be able to evaluate the factors influencing the individual behaviour in organization	L5	**PO-06**
CP-202.3	Students will be able to infer the application of various motivational theories in organization	L4	**PO-01/PO-05**
CP-202.4	Student will be able to prepare appropriate conflicts resolution methods and negotiation techniques	L6	**PO-08/PO-02**
CP-202.5	Students will be able to interpret managerial problems and take effective decision	L5	**PO-03/PO-05**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

1. ACADEMIC PERIOD: 2021-22

5. Course: MBA

2. Name of Faculty: Dr. Priti Dubey		**6. Class: II Semester**	
3. Designation: Associate Professor		**7. Subject: Human Resource Management CP-202**	
4. Contact No: , Email: pritis@lnct.ac.in		**8. Total No. of periods: 45**	
course outcome		**Level of Bloom's Taxonomy**	**Program outcome**
CP-202.1	**To help the students focus on and analyse the issues and strategies required to develop manpower planing.**	**L4**	**PO-02**
CP-202.2	Investigate and interpret the key procedures in recruitment and selection	**L6**	**PO-06**
CP-202.3	**To develop relevant skills necessary for socialisation Training and Development**	**L6**	**PO-05**
CP-202.4	**To Enable the students to Evaluate the performance and appropiate wage determination in order to take correct business decisions**	**L5**	**PO-02**
CP-202.5	To execute appropiate dispute resolution technique in various induatrial situation	**L3**	**PO-08**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LECTURE PLAN - ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty:		**6. Class: II Semester**	
3. Designation:		**7. Subject: Financial Management CP-203**	
4. Contact No: ; Email:		**8. Total No. of periods: 38**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
CP-203.1	**Student will able to analyse financial analysis technique for achiving business objectives.**	**L-04**	**PO-02/PO-01**
CP-203.2	**To select appropiate instruments of finance and analyse its effectiveness for organisation.**	**L-05**	**PO-02**
CP-203.3	**To weigh cost of different sources of raising capital and identify optimum capital structure.**	**L-05**	**PO-01**
CP-203.4	**To Compare various method of capital budgeting,**	**L-04**	**PO-06**
CP-203.5	**To investigate and evaluate working capital and divident policy .**	**L-06**	**PO-07**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE ,Bhopal-MBA			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty: Mr. Abhishek Jain		**6. Class: II Semester**	
3. Designation:		**7. Subject: Marketing Management CP-204**	
4. Contact No: ; Email:		**8. Total No. of periods: 42**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
CP-204.1	**Interpret complex marketing Environment and marketing concepts to solve marketing issues.**	**L-03**	**PO-04/PO-08**
CP-204.2	**Apply marketing concept segmentation targeting and positioning in various markets.**	**L-03**	**PO-02/PO-06**
CP-204.3	**Formulate strategies based on knowledge of 4 Ps for informed marketing decisions.**	**L-06**	**PO-07**
CP-204.4	**Analyse and apply various marketing channels and implementation of systems.**	**L-04**	**PO-2/PO-04**
CP-204.5	**Evaluate and control marketing efforts in reference to contemparary marketing issues.**	**L-05**	**PO-04/PO-08**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE ,Bhopal-MBA			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty: Dr. Bhavana Likhitkar		**6. Class: II Semester**	
3. Designation: Asso.Professor		**7. Subject: Research Methodology CP-205**	
4. Contact No: ; Email:		**8. Total No. of periods: 47**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
CP-205.1	**Student will be able to use various objective of research methodology in industry.**	**L3**	**PO-01**
CP-205.2	**Students will able to identify research problems and create hypothesis for research problems**	**L6**	**PO-07**
CP-205.3	**Students will able to Select appropate sample design .**	**L5**	**PO-2**
CP-205.4	**Examine varous method of data collection for helpful in data processing and analysis.**	**L4**	**PO-06**
CP-205.5	**Students will able to Design research report and apply statistical techniques for hypothesis testing.**	**L6/L3**	**PO-07**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE ,Bhopal-MBA			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty: Dr.Amar Singh Rahore		**6. Class: II Semester**	
3. Designation: Asso. Professor		**7. Subject: Project Management CP-206**	
4. Contact No: ; Email:		**8. Total No. of periods: 34**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
CP-206.1	**To develop strategy based on the project ideas**	**L6**	**PO-03/PO-08**
CP-206.2	**Analyze the Market demand , technical and financial feasibility.**	**L4**	**PO-04/PO-08**
CP-206.3	**To select appropate techniques of financial analysis determining risk return and cost.**	**L5**	**PO-06**
CP-206.4	**To evaluate various fanancing sources for project.**	**L5**	**PO-07**
CP-206.5	**Execute and implement the effective control of project with the help of project review techniques.**	**L3**	**PO-01**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE ,Bhopal-MBA			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty:		**6. Class: 3rd Semester**	
3. Designation:		**7. Subject: Business Policy and Strategic analysis cp-301**	
4. Contact No: , Email:		**8. Total No. of periods:**	
course outcome		**Level of Bloom's Taxonomy**	**Program outcome**
CP-301.1	**Apply understanding for the concepts and tools that support strategic management in organizations.**	**L3**	PO-01/PO-04
CP-301.2	**Critically analyse the internal and external environments in which businesses operateand assess their significance for strategic planning.**	**L4**	**PO-04/PO-08**
CP-301.3	**Examine the nature and dynamics of strategic analysis formulation andimplementation processes at corporate and business level.**	**L4**	**PO-02**
CP-301.4	**Interpreate value chain and industial analysis to design appropriate courses of action.**	**L3**	**PO-07**
CP-301.5	**Evaluate and do the comparative analysis of industry .**	**L5**	**PO-07**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE ,Bhopal-MBA			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty:		**6. Class: Ist Semester**	
3. Designation:		**7. Subject: DIS AND MIS CP-302**	
4. Contact No: , Email:		**8. Total No. of periods: 45**	
course outcome		**Level of Bloom's Taxonomy**	**Program outcome**
CP-302.1	**Apply sound managerial concepts and principles in the development and Management information systems**	**L3**	PO-01
CP-302.2	**Examine systems analysis, design and SDLC.**	**L4**	**PO-07**
CP-302.3	**Apply effective decision making skills through DSS to Improve business processes.**	**L3**	**PO-02**
CP-302.4	**Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions**	**L4**	**PO-07/PO-06**
CP-302.5	**Design, implement and evaluate DSS /MIS solution to meet a given set of requirements .**	**L5/L6**	**PO-07**
Programme Out come			
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.		
PO-02	Foster Analytical and critical thinking abilities for data based decision making.		
PO-03	Ability to develop value based leadership ability .		

PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal			
- ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty:		**6. Class: Ist Semester**	
3. Designation:		**7. Subject: Consumer Behaviour FSM-01**	
4. Contact No:	**Email:**	**8. Total No. of periods: 42**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
FSM-1.1	**sketch the relevance of consumer behaviour theories and concepts to marketing decisions**	**L3**	**PO-01**
FSM-1.2	**Analyze the information for processing decision rules and perception.**	**L4**	**PO-06**
FSM-1.3	**Relate to influence of personality and Attitude on Buying Behaviour**	**L4**	**PO-02**
FSM-1.4	**Judge various reference groups for consumer decision making**	**L5**	**PO-08**
FSM-1.5	**Evaluate industrial buying behaviour and its application**	**L5**	**PO-07**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal			
LECTURE PLAN - ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty:		**6. Class: Ist Semester**	
3. Designation:		**7. Subject: Advertising Management FSM-02**	
4. Contact No: ; Email:		**8. Total No. of periods: 38**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
FSM-2.1	**Analyze the relevant research in advertising and marketing communication**	**L4**	**PO-04**
FSM-2.2	**Apply DAGMAR approach in setting effective objective and target audience**	**L4**	**PO-01**
FSM-2.3	**Design effective advertising programme and media plan**	**L6**	**PO-07**
FSM-2.4	**Evaluate effective advertising communication for various advertising approaches.**	**L5**	**PO-07**
FSM-2.5	**Formulate creative strategies based on various levels of advertising.**	**L6**	**PO-08**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal	
ACADEMIC YEAR 2021-22	
1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**
2. Name of Faculty:	**6. Class: Ist Semester**
3. Designation:	**7. Subject: Management of Industrial Relation FS0-01**
4. Contact No: ; Email:	**8. Total No. of periods: 47**

CO	Course Outcome	Level of Bloom's Taxonomy	Program outcome
FSO-1.1	**To analyze prespective and issues in the area in order to effectively manage employee relations.**	**L4**	**PO-08**
FSO-1.2	**To Examine the trade union and its role in Industrial Relations**	**L4**	**PO-05**
FSO-1.3	**To develop insights into effective use and application of the Grivance redressals for employee relations management**	**L6**	**PO-07**
FSO-1.4	**To interpret and implement the productive bargaining techniques and gain sharing in the organization.**	**L3**	**PO-05**
FSO-1.5	**To Analyse Industrial Relation with respect to tehnological change**	**L4**	**PO-04/PO-08**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.

PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty:		**6. Class: III Semester**	
3. Designation:		**7. Subject: Management of Training and Development FS0-02**	
4. Contact No: ; Email:		**8. Total No. of periods: 47**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
FSO-2.1	**Student will be able to use the concept of training process to solve contemporary training challenges.**	**L3**	**PO-01**
FSO-2.2	**Student will be able to evaluate training needs for practical problem in organisation.**	**L5**	**PO-02/PO-06**
FSO-2.3	**Student will be able to develop appropiate instructional objective and lession plan based on the pedagogy.**	**L6**	**PO-07**
FSO-2.4	**Student will be able to design training modules using effective training methods and techniques.**	**L6**	**PO-07**
FSO-2.5	**Student will be able to test the effectiveness of training using different evaluation methods**	**L5**	**PO-01/PO-08**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty:		**6. Class: III Semester**	
3. Designation:		**7. Subject: Security Analysis and investment management FSF-01**	
4. Contact No: ; Email:		**8. Total No. of periods: 47**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
FSF-1.1	**Interpret basic concepts of investments and the nuances of securities and indian stock market.**	**L3**	**PO-06**
FSF-1.2	**Illustrate knowledge of investing in market indices and assuming returns.**	**L3**	**PO-02/PO-06**
FSF-1.3	**Examine valuation theories for utilizing knowledge gained for optimum investment decisions**	**L4**	**PO-01**
FSF-1.4	**Analyze and apply models to securities performance and forecasting**	**L4**	**PO-01/PO-04**
FSF-1.5	**Evaluate stock market in Indian context with the help of market theories and approaches**	**L5**	**PO-02/PO-04**
Programme Out come			
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.		
PO-02	Foster Analytical and critical thinking abilities for data based decision making.		
PO-03	Ability to develop value based leadership ability .		
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.		
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.		
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.		

PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty:		**6. Class: III Semester**	
3. Designation:		**7. Subject: Working Capital Management FSF-02**	
4. Contact No: ; Email:		**8. Total No. of periods: 47**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
FSF-2.1	Evaluate the types of working capital available to a company and its determinants.	**L5**	**PO-06**
FSF-2.2	Evaluate a company's management of accounts receivable, inventory, and accounts payable over time and compared to peer companies.	**L5**	**PO-02/PO-08**
FSF-2.3	Explain the effect of different types of cash flows on a company's net daily cash position.	**L4**	**PO-05**
FSF-2.4	Interpreate the need of inventory management in codification and valueation of inventries.	**L3**	**PO-02**
FSF-2.5	Measure working capital effectiveness of a company based on its operating and cash conversion cycles, and compare the company's effectiveness with that of peer companies.	**L5**	**PO-06**
Programme Out come			
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.		
PO-02	Foster Analytical and critical thinking abilities for data based decision making.		+
PO-03	Ability to develop value based leadership ability .		+
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.		
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.		
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.		
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.		
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.		

LNCTE, Bhopal

ACADEMIC YEAR 2021-22

1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**
2. Name of Faculty:	**6. Class: III Semester**
3. Designation:	**7. Subject: Management of Banking and Insurance Institutions FSB-01**
4. Contact No: ; Email:	**8. Total No. of periods: 47**

CO	Course Outcome	Level of Bloom's Taxonomy	Program outcome
FSF-2.1	Apply knowledge of banking operations and regularaty frame work in the analysis of financial institutions .	**L3**	**PO-04**
FSF-2.2	Evaluate Asset Liability Management (ALM) for measuring, monitoring and managing the market risk of a bank.	**L5**	**PO-01**
FSF-2.3	Analyze the Role of banking insitutions and Intermediaries.	**L4**	**PO-02/PO-04**
FSF-2.4	Interpret types of insurance and concept of Regulatory Framework of Insurance Sector.	**L3**	**PO-02**
FSF-2.5	Compare various insurance and working principles of financial instruments	**L4**	**PO-06**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

+

+

LNCTE, Bhopal			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty:		**6. Class: III Semester**	
3. Designation:		**7. Subject: Financial Planning and Wealth Management FSB-02**	
4. Contact No: ; Email:		**8. Total No. of periods: 47**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
FSF-2.1	Use finance concepts and process for financial planning	**L3**	**PO-02**
FSF-2.2	Analyze the risk for various insurance products and its management	**L4**	**PO-06**
FSF-2.3	Compare various benefits and regulations for retirement planning	**L5**	**PO-04**
FSF-2.4	Evaluate investment planning instrument in view of wealth management	**L5**	**PO-02**
FSF-2.5	Apply knowledge of tax compliances and structure in India for effective tax plannning	**L3**	**PO-04/PO-06**
Programme Out come			
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.		
PO-02	Foster Analytical and critical thinking abilities for data based decision making.		
PO-03	Ability to develop value based leadership ability .		
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.		
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.		
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.		
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.		

1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
Name of Faculty:		**6. Class: IV Semester**	
3. Designation:		**7. Subject:Business Legislation CP-402**	
4. Contact No: , Email:		**8. Total No. of periods:**	
course outcome		**Level of Bloom's Taxonomy**	**Program outcome**
CP-401.1	**Utilised the knowledge of company laws incorporate different type of companies.**	**L3**	PO-01/PO-04
CP-401.2	**Identified laws related to contract for performance and breach and remedies.**	**L4**	**PO-04/PO-08**
CP-401.3	**Achive knowledge regarding consumer protection laws to save guard consumers right.**	**L4**	**PO-02/PO-04**
CP-401.4	**Demenstrate skills to deal with pollution environment and IPR issues of company**	**L3**	**PO-07**
CP-401.5	**Develop approach to lead mergers and aquication in view of MNC'S in India.**	**L6**	**PO-04/PO-03**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE ,Bhopal-MBA			
ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty:		**6. Class: IV Semester**	
3. Designation:		**7. Subject: Enterprenureship Development and managementcp-402**	
4. Contact No: , Email:		**8. Total No. of periods: 45**	
course outcome		**Level of Bloom's Taxonomy**	**Program outcome**
CP-402.1	**Identify competencies to be an entrepreneur**	**L3**	**PO-03**
CP-402.2	**Disover and analyze various institutional support system to develop entrepreneurship**	**L4**	**PO-04**
CP-402.3	**Assess the suitable form of business organization for starting small scale enterprise**	**L-5**	**PO-02**
CP-402.4	**Design project report with necessary feasibility analysis**	**L-6**	**PO-06/PO-02**
CP-402.5	**Demonstrate the qualities to effective communication, inventory management and record keeping**	**L-3**	**PO-03**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.

PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal	
- ACADEMIC YEAR 2021-22	
1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**
2. Name of Faculty:	**6. Class: IV Semester**
3. Designation:	**7. Subject: Sales and distribution management -FSM-03**
4. Contact No: Email:	**8. Total No. of periods: 42**

CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
FSM-3.1	**To be able to set and formulate Personal Selling objectives**	**L3**	**PO-01**
FSM-3.2	**To be able to develop sales training programme for sales personnel**	**L6**	**PO-02/PO-7**
FSM-3.3	**To be able to design territories and allocate sales quota to sales personnel**	**L6**	**PO-02/PO-5**
FSM-3.4	**To be able to categorize various marketing channels and identify appropriateness for distribution**	**L4**	**PO-06/PO-07**
FSM-3.5	**To be able to assess the performance of marketing channels**	**L5**	**PO-08/PO-06**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-	Ability to develop value based leadership ability .

03	
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal

LECTURE PLAN - ACADEMIC YEAR 2021-22

1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**
2. Name of Faculty:	**6. Class: IV Semester**
3. Designation:	**7. Subject: Service Marketing FSM -04**
4. Contact No: ; Email:	**8. Total No. of periods: 38**

CO	Course Outcome	Level of Bloom's Taxonomy	Program outcome
FSM-4.1	**Apply the concept of service marketing mix to develop effective marketing strategies for services.**	**L3**	**PO-02**
FSM-4.2	**Devise strategy for influencing for customer perception for services**	**L6**	**PO-07/PO-02**
FSM-4.3	**Creating suitable pricing strategy for service products.**	**L6**	**PO-04**
FSM-4.4	**Reviewing the role of people physical evidence and process in developing service marketing strategy.**	**L5**	**PO-06**
FSM-4.5	**Measuring the customer satisfaction level and resolving complaints using various models.**	**L3**	**PO-01/PO-02**

Programme Out come

PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal	
ACADEMIC YEAR 2021-22	
1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**
2. Name of Faculty:	**6. Class: IV Semester**
3. Designation:	**7. Subject: Human Resource Planning and Development FSO-03**
4. Contact No: ; Email:	**8. Total No. of periods: 47**

CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
FSO-3.1	**To analyse the strategic issues and strategies require to select and develop man power resources.**	**L3**	**PO-02**
FSO-3.2	**To develop necessary skills and techniques of manpower demand and supply.**	**L4**	**PO-06**
FSO-3.3	**Ability to implement the practice related to employee retention, redeployment and exit strategies.**	**L5**	**PO-04**
FSO-3.4	**To evaluate the performance and potential appraisal technique in industries**	**L5**	**PO-02**
FSO-3.5	**To design the HRD Strategies and evaluate the human resource accounting system.**	**L3**	**PO-04/PO-06**

Programme Out come	

PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal

ACADEMIC YEAR 2021-22

1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**
2. Name of Faculty:	**6. Class: IV Semester**
3. Designation:	**7. Subject: Compensation Management FSO-04**
4. Contact No: ; Email:	**8. Total No. of periods: 47**

CO	Course Outcome	Level of Bloom's Taxonomy	Program outcome
FSO-4.1	**Student can able to analyse the philosophies and issues of compensation management**	**L3**	**PO-02**
FSO-4.2	**Student can able to evaluate the different fringe benefits and develop the basic pay system.**	**L4**	**PO-7**
FSO-4.3	**Student can able to inference the theories of wages and wage structure.**	**L3**	**PO-04**
FSO-4.4	**Student can able to estimate the issues related to law based performance pay system in compensation.**	**L6**	**PO-7/PO-08**
FSO-4.5	**Student can able to design the compensation strategy and examine the wage board.**	**L6**	**PO-7/PO-08**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal	
ACADEMIC YEAR 2021-22	
1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**
2. Name of Faculty:	**6. Class: IV Semester**
3. Designation:	**7. Subject: Management of Financial Services FSF-03**
4. Contact No: ; Email:	**8. Total No. of periods: 47**

CO	Course Outcome	Level of Bloom's Taxonomy	Program outcome
FSF-3.1	**Apply the concept financial system and market to organisation problem**	**L3**	**PO-01**
FSF-3.2	**Analysed and evaluate risk in financial services and mutual funds.**	**L4/L5**	**PO-05/PO-06**
FSF-3.3	**Estimate the issue of share bounds and fixed deposit, corporate loans.**	**L6**	**PO-07**
FSF-3.4	**Compare and choose from various financial services.**	**L5**	**PO-07**

FSF -3.5	**Discuss the concept and issues related to banking and insurance.**	**L6**	**PO-08**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

LNCTE, Bhopal

ACADEMIC YEAR 2021-22

1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**
2. Name of Faculty:	**6. Class: IV Semester**
3. Designation:	**7. Subject: Strategic Corporate Finance FSF-04**
4. Contact No: ; Email:	**8. Total No. of periods: 47**

CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
FSF -4.1	To enable the student to identify the key themes in corporate finance	**L3**	**PO--03**
FSF -4.2	Determine the overall strategy of the firm and factor affecting company financial strategy.	**L4**	**PO-07**

FSF -4.3	Build the concept of corporate tax and GST .	**L3**	**PO-04**
FSF -4.4	Student can able to measure and solve the issue related to bouns,inter corporate investment and innovative financial products.	**L5**	**PO-06**
FSF -4.5	Student can able to evaluate strategic alliance, advantage disadvantage and steps to forming a joint venture.	**L5**	**PO-06**

Programme Out come		
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.	
PO-02	Foster Analytical and critical thinking abilities for data based decision making.	+
PO-03	Ability to develop value based leadership ability .	+
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.	
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.	
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.	
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.	
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.	

LNCTE, Bhopal

ACADEMIC YEAR 2021-22	
1. ACADEMIC PERIOD: 2021-22	**5. Course: MBA**
2. Name of Faculty:	**6. Class: IV Semester**
3. Designation:	**7. Subject: Financial Institution and Markets FSB-03**
4. Contact No: ; Email:	**8. Total No. of periods: 47**

CO		Level of Bloom's Taxonomy	Program outcome
FSB -3.1	Student can able to demostrate the indian financial markets n with special reference to SEBI,NBF'C and Indian Mutual Funds.	**L3**	**PO-04**
FSB -3.2	Student can able to evaluate the concept of money ,foreign exchange,pension,Securities,mortgage and derivetives markets	**L4**	**PO-01**
FSB -3.3	Determine the theories related to interest rates.	**L5**	**PO-02/PO-04**
FSB -3.4	Examine the risk management in financial institution and managing risk with balance sheet.	**L3**	**PO-02**
FSB -3.5	Compare indian and international eurocurrency markets.	**L5**	**PO-06**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.
PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.

ACADEMIC YEAR 2021-22			
1. ACADEMIC PERIOD: 2021-22		**5. Course: MBA**	
2. Name of Faculty:		**6. Class: IV Semester**	
3. Designation:		**7. Subject- Financial Risk Management FSB-04**	
4. Contact No: ; Email:		**8. Total No. of periods: 47**	
CO	**Course Outcome**	**Level of Bloom's Taxonomy**	**Program outcome**
FSB-4.1	Student can able to use different techniques and methods of financial risk management in real life situation.	**L3**	**PO-02**
FSB-4.2	Analyse the mechanism of future markets.	**L4**	**PO-06**
FSB-4.3	Evaluate the models related to trading and stock indices.	**L5**	**PO-04**
FSB-4.4	Student can able to evaluate the swaps including interest rate, commodity, currency and pricing.	**L5**	**PO-02**
FSB-4.5	Student can able to aply the concept related to market derivetives.	**L3**	**PO-04/PO-06**

Programme Out come	
PO-01	Apply Knowledge of Management Theories and Practices to solve Business Problems.
PO-02	Foster Analytical and critical thinking abilities for data based decision making.
PO-03	Ability to develop value based leadership ability .
PO-04	Ability to understand, analyze and communicate global, economic, legal and ethical aspects of business.
PO-05	Ability to lead themselves and other in the achievement of organizational goals, Contributing effectively to team environment.
PO-06	Integrated the knowledge of management to solve complex corporate problems using limited resources.
PO-07	Identify and Evaluate business opportunities, design and implement innovations in work space.

PO-08	Developing Contextual Social Problems /Issues and exploring solutions related to business Environment.