Jayawantrao Sawant College of Engineering, Pune

Institute Vision Mission

Vision

To satisfy the aspirations of youth force who want to lead Nation towards prosperity through techno-economic development

Mission

To provide, nurture and maintain an environment of high academic excellence, research and entrepreneurship for all aspiring students, which will prepare them to face global challenges maintaining high ethical and moral standards.

Department of Electronics and Telecommunication Engineering

Department Vision Mission

Vision

"To be recognized as a centre for human resource development in the field of Electronics &Telecommunication engineering".

Mission

M1.To imbibe core and professional competencies in students by providing conducive academic environment.

M2.To provide platform for innovations and entrepreneurship by undertaking real time problems.

M3. To nurture an ethical and societal responsibilities amongst the learner for global environmental sustainability.

M4. To promote students for higher studies by adapting cutting edge technology.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1. Graduates shall have core technical competency to address the real world issues in the domain of Electronics and telecommunication engineering, receptive to emerging trends.

PEO2. Graduates shall have ability to develop sustainable solutions to satisfy diversified needs of the society.

PEO3. Graduates shall engage in lifelong learning with socio economic responsibilities in multi disciplinary domain.

PROGRAMME OUTCOMES

Engineering Graduates will be able to:

1	Engineering knowledge	Apply the knowledge of mathematics science engineering fundamentals and mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems engineering problems.
2	Problem analysis	Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	Design/development of solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	Conduct investigations of complex problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	Modern tool 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 limitations.
6	The engineer and society	Apply reasoning informed by Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	Environment and sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development and need for sustainable development.
8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and team Work	Function effectively as an individual and as a member or leader in diverse teams and individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	Project management and finance	Demonstrate knowledge and understanding of the engineering and 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.
12	Life-long learning	Recognize the need for and have the Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES

Electronics and Telecommunication Graduates will be able :

1	To gain proficiency in designing the communication systems for engineering applications.
2	To apply the knowledge of design and development to the Electronic systems based on VLSI and embedded technology.
3	To integrate automation processes with the support of hardware.
4	To develop software programs for simulation and implementation in the process of solving multidisciplinary engineering problems.

COURSE OUTCOMES

SEMESTER I

Course Code	University Code	Course	Course Outcomes (COs) statement
	Second Year- Electronics and Telecommunication		
C201	204181	Signals and Systems	1. Analyze classification of systems with mathematical expressions and operate continuous and discrete time signals. 2. Formulate input output relationship for LTI systems and interpret system response with convolution. 3. Evaluate the signals in frequency domain using Fourier series and Fourier transform. 4. Compute Laplace transform and develop the ability analyze system by using properties 5. Classify Correlation of signals and probability function of event.
C202	204182	EDC	1. Interpret the behavior of FET for DC & AC analysis. 2. Describe the need of biasing and operating point of MOSFET with the stability. 3. Analyze small signal & low frequency model of MOSFET 4. Understand the features of electronics components by using MOSFET circuits. 5. Compare the performance parameters of amplifiers in presence with respect to positive and negative feedback. 6. Design linear regulated power supply and understands the working of switch mode power supply.

C203	204183	ECM	1. Analyze electrical circuits by using network theorems. 2. Explain the working principle of different electrical machines. 3. Selection of electrical machine for given application. 4. Explain and analyze the transformers.
C204	204184	Data Structure and Algorithms	1. An ability to identify the appropriate data structure to enhance programming skill by applying knowledge of basic data structures. 2. Classify several searching and sorting methods to analyze and interpret the data with the help of time and space complexity. 3. Organization of data structures to evaluate mathematical expression to solve engineering problems for industry & research. 4. Organization & implementation of data to provide flexibility in programming. 5. Organization of composite data to solve the problems by demonstrating non-linear data structures. 6. An ability to select an appropriate algorithm to satisfy eco-social needs and safety.
C205	204185	Digital Electronics	1. Develop a system using combinational circuits to solve the various problems by applying knowledge of Boolean algebra. 2. Develop a system using sequential circuits to solve the various problems by applying knowledge of flip flop excitation table, registers and counters. 3. Demonstrate the concept of FSM and ASM through digital electronics application. 4. Analyze different types of digital logic families for effective design of electronic system. 5. Apply the knowledge of combinational and sequential logic design methods to model the complex digital circuits. 6. Describe the architecture and instruction set of 8051 microcontroller to develop a microcontroller based system for simple engineering applications.
C206	204186	EMIT	1. Describe the fundamentals of electrical measuring instruments with specifications, features and capabilities of electronic instruments and Fundamentals of electrical measuring 2. Exemplify an instrument for given measurements. 3. Illustrate the required measurements using various instrument setups. 4. Analyze the appropriate instrument for interpret the measurement of electrical parameters professionally.

SEMESTER-II			
Second Year- Electronics and Telecommunication			
C210	207005	EM-III	1. Apply higher order linear differential equations to model and solving LCR circuit problems. 2. Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing. 3. Determine Interpolating polynomials, numerically differentiate and integrate functions,numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing. 4. Solve vector differentiation problems, analyze the vector fields 5. Apply the theorems for vector integral calculus problems andElectro-Magnetic fields. 6. Determine conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.
C211	204187	IC	1. Explain basic building blocks of op-amp with performance parameters and closed loop configurations. 2. Analyze linear and non linear applications of OPAMP. 3. Compare OPAMP based convertors. 4. Elaborate Phase Locked Loop and Oscillator with its applications 5. Design Active Filter using OPAMP.
C212	204188	CS	1. Understand the stability of a closed-loop control system. 2. Apply time domain parameters for control systems analysis. 3. Inspect control systems stability in frequency domain. 4. Express system equations in state variable form. 5. Introduce controllers and digital control system.
C213	204189	OOP	1. Describe the principles of object oriented programming. 2. Apply the concepts of data encapsulation, inheritance in C++. 3. Understand and use basic program constructs in Java 4. Understand and use basic program constructs in Java 5. Use inheritance, package and interfaces concept to write application oriented programs in Java 6. Develop application oriented multithreading programs in java
C214	204190	Analog Communication	1. Analyze generation and transmission of AM signals with it's spectrum & Power. 2. Distinguish AM receivers with performance characteristics and demodulation methods. 3. Illustrate Frequency and phase modulation for differentiating Narrow band & Wide band signals. 4. Contrast FM receivers with detection techniques.

			5. Evaluate noise parameters for analog communication system in presence of noise. 6. Express pulse modulation techniques with the help of sampling theorem.
SEMESTER-I			
Third Year- Electronics and Telecommunication			
C301	304181	DC	1. Demonstrate the use of source coding methods 2. Analyze the channel blocks for digital communication systems 3. Determine impact of random noise in digital communication system 4. Categorize the baseband receivers for received input for bandwidth and symbol rate 5. Distinguish between passband receivers 6. Illustrate the use of spread spectrum technology for digital communication systems
C302	304182	DSP	1. Identify concept of sampling and orthogonality and mapping between analog to digital domain. 2. Carryout DT signal and system using DFT and its significance and problem related to computational complexity. 3. Test DTLTI system using Z transform by applying its properties. 4. Construct digital IIR filter for given filter specifications. 5. Design digital FIR filter to meet specific magnitude and linear phase requirements. 6. Discuss different DSP applications.
C303	304183	Electromagnetics	1. Understand the basic mathematical concepts related to electromagnetic vector fields. 2. Apply the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density. 3. Apply the principles of Magnetostatics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density. 4. Understand the concepts related to Faraday‘s law, induced e.m.f. and Maxwell‘s equations. 5. Apply Maxwell‘s equations to solutions of problems relating to transmission lines and uniform plane wave propagation.
C304	304184	Microcontrollers	1. Explain the architecture, features & peripheral support of PIC microcontroller. 2. Interpret Input Output port interfacing & programming environment of PIC microcontroller. 3. Simulate small embedded application for PIC microcontroller using assembly language programming. 4. Understand the architecture, features & peripheral support of PIC microcontroller.

			5. Describe interfacings with PIC microcontroller using port structure & interrupt structure. 6. Simulate small embedded application for PIC microcontroller using embedded C.
C305	304185	Mechatronics	1. Understand basic elements of mechatronics system and its characterization. 2. Categorize different types of sensors and transducers and their selection as per need of application. 3. Identify the hydraulic actuators for hydraulic system applications. 4. Illustrate pneumatic actuators and their use for pneumatic system applications. 5. Discuss electric, electro-mechanical actuators including their parameter consideration. 6. Apply the knowledge of mechatronics elements in automobile applications.
C306		ESD	1. Describe the fundamentals of electrical measuring instruments with specifications, features and capabilities of electronic instruments. 2. Exemplify an instrument for given measurements. 3. Illustrate the required measurements using various instrument setups. 4. Analyze the appropriate instrument for interpret the measurement of electrical parameters professionally.
SEMESTER-II			
Third Year- Electronics and Telecommunication			
C310	304186	Power Electronics	1. Understand the construction and working of power devices with their gate driving circuits. 2. Analyze types of single phase & three phase controlled rectifiers (AC to DC Converters). 3. Illustrate single phase & three phase controlled Inverters (DC to AC Converters). 4. Examine the types of choppers & AC voltage controller. 5. Distinguish resonant converters & protection circuits. 6. Infer the types of UPS and different motor drives.
C311	304187	ITCCN	1. Perform information theoretic analysis of communication system specifically for data compression by means of source coding techniques. 2. Evaluate channel coding techniques for error detection and correction in communication system and computer network. 3. Design cyclic codes and encoder-decoder circuits by understanding the Galois field arithmetic. 4. Comprehend fundamental principles of data communication and networking. 5. Understand the flow and error control techniques in

			communication network.
C312	304188	BM	1. Illustrate fundamentals of Management thoughts, vital for understanding the conceptual frame work of Business Management as a discipline. 2. Evaluate quality assessment tools for project development. 3. Analyze financial of Project Management process for execution of ideas. 4. Demonstrate role & responsibilities of best suitable HR organization professional to acquire human resource for an 5. Develop Entrepreneurship skills. 6. Understand different Marketing environment & consumer behaviors.
C313	304189	AP	1. Relate the ARM microprocessor architecture & DSP architecture to recognize its applications. 2. Utilize advanced peripherals to interface with ARM based microcontrollers 3. Develop an Embedded System to solve real time problems. 4. Make use of DSP Processors and resources for signal processing.
C314	304190	SPOS	1. Utilize the components of system software for implementation of assembler and macro processor 2. Understand system software concepts as linker, loader and compilers 3. Classify the Operating Systems with the knowledge of its fundamentals. 4. Infer concurrency controls in OS 5. Evaluate different memory management schemes 6. Illustrate the IO and file management policies.
SEMESTER-I			
Final Year- Electronics and Telecommunication			
C401	404181	VLSI	1. Implement digital system design modules using VHDL coding . 2. Determine adequacy of efficient VHDL modeling by focusing design issues 3. Understand architectures to model digital circuit with simulate, synthesis & prototype in CPLD/FPGA. 4. Design digital CMOS circuit to estimate chip area , power & speed.

			5. Analyze issues & constraints in ASIC Design 6. Apply testing methodology in digital design and built self test circuit.
C402	404182	Computer Network	1. Understand MAC protocols and basic principles of wired & wireless LANs. 2. Describe and analyze the Network layer services and its performance, IP protocol, IP Packet forwarding techniques, IPv4 and Mobile IP. 3. Summarize unicast & multicast network routing algorithms and explain IGMP & IPv6 protocols. 4. Compare transport layer protocols and evaluate their performance. 5. Explain the concept of C-S Model for HTTP, DNS, FTP, DHCP, Email and Telnet using Windows XP/2003 Server systems applications. 6. Discuss the concept of cryptography and elaborate network & internet security.
C403	404183	RMT	1. Explain different terminologies of radiating elements to analyze various performance parameters. 2. Analyze different antenna to evaluate array factor for antenna array. 3. Implement different modes of transmission lines during the wave propagation. 4. Design microwave communication network by using passive microwave components. 5. Generate the electromagnetic waves with the help of microwave tubes and solid state devices. 6. Measurements for different microwave parameters of microwave test bench.
C404	404184	IOT	1. Understand the architecture and basic knowledge of IoT systems. 2. Interface sensors and actuators to IoT on WSN platform. 3. Apply wireless technology and IP based protocols for design of IoT systems. 4. Use data storage techniques in IoT systems. 5. Implement applications of IoT for betterment of society.
C405	404185	ESRTOS	1. To recognize embedded system design metrics for developing real time applications with software development life cycles. 2. To Classify RTOS & GPOS and verify its services 3. To Practice UCOS-II RTOS and its services 4. To Apply modern microcontroller architecture for Real-world embedded system interfacing 5. To Demonstrate the Embedded Linux Environment for Linux Kernel Construction and device driver's development. 6. To utilize open source platform for embedded system development.

C406	404186	EPD	1. Illustrate the stages of product design aspects. 2. Identify the basic requirements for hardware design & testing methods using product parameters. 3. Use the appropriate software platform for the testing & real time Programming. 4. Understand the PCB design techniques. 5. Test & debug the designed electronics product. 6. Recognize the importance of Preparation, Presentation, and Preservation of product documents.
SEMESTER-II			
Final Year- Electronics and Telecommunication			
C410	404189	MC	1. Illustrate switching techniques for voice and data traffic. 2. Evaluate the performance parameters in traffic engineering. 3. Demonstrate basic concepts of cellular network & propagation mechanism. 4. Interpret GSM network and its applications. 5. Infer data transmission in GSM & its services. 6. Understand evolution of GSM & CDMA technologies
C411	404190	BCS	1. Describe the primary components fiber optical communication systems. 2. Design Link power budget and Rise Time Budget by proper selection of components and check its viability. 3. Understand the role of WDM components in advanced fiber optical communication systems. 4. Analyze various launching techniques and orbital mechanisms to get communication system as per engineering norms 5. Identify various satellite subsystems to meet the socio economic challenges 6. Design and analyze satellite link for sustainable satellite communication
C412	404191	PLC	1. Analyze the type of control system for their selection in process industry. 2. Design a signal conditioning circuit as per the sensor interface requirement. 3. Discover the need of various controller modes and actuators for applications in multi-disciplinary process and environment. 4. Interpret PLC architectures and modern communication technology for various industrial systems by comparing them. 5. Implement a SCADA and HMI system for automation applications. 6. Understand CNC Machine tools and process.
C413	404192	AVE	1. Understand the concept of colour television along with standards 2. Describe the digital TV,Digital Video Compression Techniques and LED,LCD Display Devices 3. Analyzeadvanced television systems- HD TV, IP TV,Mobile

			TV,Wi-Fi TV,3D TVanddigital broadcasting 4. Interpret audio recording systems and acoustics principles
C414	404193	WSN	1. Understand Wireless Sensor Network different Concepts and Terminologies. 2. Recognize use of Radio Communication and importance of Link Management in WSN 3. Illustrate various wireless standards and protocols associated with Wireless Sensor Network 4. Identify Localization concept and Routing Techniques used in WSN 5. Explain various techniques of Data Aggregation and importance of security in Wireless Sensor Network 6. Monitor and Coordinate the issues involved in design and deployment of Wireless Sensor Network
		PROJECT	1. Understand the problems in society, organization or industry and through literature survey and apply engineering knowledge to convert it into open ended problem statement. 2. Select appropriate techniques, resources and modern engineering tools to demonstrate and interpret the said work through proper documentation. 3. Design, analyze and evaluate the performance of the real time system with consideration of the ethical, societal and environmental approach. 4. Communicate effectively on designed system through presentation report writing with proper product management and finance aspects.

Department of Information Technology

Vision Mission

"To develop competent IT professionals for e-development of emerging societal needs."

Mission

M1. Educating aspirants to fulfill technological and social needs through effective teaching learning process.

M2. Imparting IT skills to develop innovative solutions catering needs of multidisciplinary domain.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Nurture Information technology resource who will work for diversified needs of Academia, industry, and research.

PEO2: Inculcate problem-solving skills using IT tools to solve socio-economic problems ethically.

PEO3: Instill qualities of leadership, innovation, and entrepreneurship with effective communication skills, teamwork and create the ability for life-long learning.

PROGRAMME OUTCOMES

Engineering Graduates will be able to:

1	Engineering knowledge	Apply the knowledge of mathematics science engineering fundamentals and mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems engineering problems.
2	Problem analysis	Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	Design/development of solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	Conduct investigations of complex problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	Modern tool 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 limitations.
6	The engineer and society	Apply reasoning informed by Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	Environment and sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development and need for sustainable development.
8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and team Work	Function effectively as an individual and as a member or leader in diverse teams and individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	Project management and finance	Demonstrate knowledge and understanding of the engineering and 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.
12	Life-long learning	Recognize the need for and have the Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES

Information Technology Graduates will be able to:

1	Solve problems in areas like Software Design and Development, Computer Architectures and Operating System, web systems, Computer Networks and Database Management Systems to address critical challenges in the field of IT.
2	Apply skills in Design and Development of Software systems, Operating System, Database Management, Computer networks and Web Technologies.
3	Exhibit active participation in multidisciplinary applications.

COURSE OUTCOMES

Academic year 2019-20

SEMESTER I

Course Code	University Code	Course	Course Outcomes (COs) statement
	Second Year- Information Technology		
C201	214441	Discrete Structures	6. Calculate number of possible outcomes using permutation and combination 7. Explain concept of sets & proposition and apply it to solve real time problems 8. Describe and analyze relation and functions 9. Construct different types of trees and graphs and apply them to solve real world problems 10. Analyze the properties of groups and rings
C202	214442	Computer Organization and Architecture	1. Able to analyze the performance of computer based upon the various metrics and solve problems based on computer arithmetic 2. Able to identify the fields of instruction and explain processor structure & its functions 3. Analyze and design the multiplier CU based upon the control unit design methods and Obtain knowledge about microprogramming of a processor. 4. Able to identify the memory types and Understand concepts related to memory & IO organizations 5. Able to analyze instruction level parallelism in MIPS system and acquire knowledge about parallel organization of multiprocessors & multi core systems.
C203	214443	Digital Electronics and Logic Design	1. Demonstrate knowledge of number system, Boolean algebra, TTL and CMOS logic 2. Build different combinational circuit by using reduction techniques. 3. Examine Sequential circuits viz. Flip-Flops, Counter and their applications. 4. Implement sequence generators by using registers 5. Design different Programmable Logic Devices (PLD) by using SOP. 6. Implement VHDL Programming by using different modeling styles.
C204	214444	Fundamentals of Data Structures	7. Apply appropriate constructs of C language and coding standards to design various applications. 8. Develop various applications using dynamic memory allocation and file handling concepts. 9. Analyze the algorithms with respect to time and space complexity. 10. Develop various applications using appropriate searching and /or sorting techniques and analyze time and

			space complexity of searching and sorting techniques. 11. Design and implement program and solve problem using appropriate data structures and algorithms.
C205	214445	Problem Solving and Object Oriented Programming	1. Able to apply programming skills and problem solving concepts to solve problems using computers. 2. Able to Design solution for real time problem using logic structures and object oriented programming. 3. Able to develop object oriented programming and problem solving skills using OOP concepts. 4. To apply tools and best practices in object –oriented programming.

Third Year- Information Technology			
C301	314441	Theory Of Compu tation	1. Able to Design Finite State Machine with and without output for a given problem. 2. Able to Construct Regular Expression for a given formal language. 3. Able to Identify Context Free Grammar and apply grammar rules for syntax analysis. 4. Able to Design Pushdown Automata, Post Machine and Turing machine for a given formal language. 5. Able to Interpret the problems of decidability, reducibility and time complexity.
C302	314442	Database Managemen t Systems	1. Describe the basic functionality of RDBMS and analyze database model for a sample system. 2. Design a database and implement a database schema for a given problem domain using SQL commands and transaction processing. 3. Describe the concept of concurrency control for transactions and use of recovery processes. Also describe various database architectures. 4. Analyze the impact of big data on the information industry using data services like XML, Hadoop, JSON, and MongoDB. 5. Describe the concept of data warehousing and data mining.
C303	314443	Software engineering & Project Management	1. To analyze and apply appropriate lifecycle model of software development 2. To identify software requirements by applying various modeling techniques. 3. To apply project planning and scheduling techniques in given project management task 4. To understand principles of agile development, SCRUM process and analyze agile process model from other process models. 5. To apply various software tools and techniques for project monitoring and control with risk and quality management. 6. To practice current and future trends of IT industry in software engineering and project management.
C304	314444	Operating System	1. Describe the concept of Operating system and Implement Shell programming as well as kernel programming. 2. To apply the concept of process, thread and Implement Process management System call. 3. To implement Classical Synchronization Problems and describe the concept of memory management. 4. To apply the concept of Disk scheduling and Implement File Handling System Calls.
C305	314445	Human-Computer Interaction	1. To explain importance of HCI study and principles of user-centered design (UCD) approach.

			2. To develop understanding of human factors in HCI design. 3. To develop understanding of models, paradigms and context of interactions. 4. To design effective user-interfaces following a structured and organized UCD process. 5. To evaluate usability of a user-interface design. 6. To apply cognitive models for predicting human-computer-interactions.

C309	314449	Audit Course 3 Professional Ethics and Etiquettes	1. To summarize the principles of proper courtesy as they are practiced in the workplace. 2. To describe ways to apply proper courtesy in different professional situations. 3. To practice appropriate etiquettes in the working environment and day to day life. 4. To learn and build proper practices for global corporate world.
		Audit Course 3 Digital & Social Media Marketing	1. Develop a far deeper understanding of the changing digital landscape. 2. Identify some of the latest digital marketing trends and skill sets needed for today's marketer. 3. Successful planning, prediction, and management of digital marketing campaigns. 4. Implement smart management of different digital assets for marketing needs. 5. Assess digital marketing as a long term career opportunity.
	Fourth Year- Information Technology		
C401	414453	Information and Cyber Security	1. Design and implement the solution to the complex engineering problem of Information and Cyber using Number theory. 2. Able to analyze, implement various security algorithm and Develop analytical competency to identify the solutions to various security principles 3. Able to identify risk analysis for information security. 4. To identify need of Cyber Security and cyber crime techniques to state Laws that govern cyber crime.
C402	414454	Machine Learning and Applications	1. Explain the concept of machine learning 2. Apply classification methods to measure performance and accuracy 3. Apply regression methods to measure performance and accuracy and discuss the concept of theory of generalization 4. Demonstrate logic based ,algebraic ,probabilistic model 5. To describe trends in machine learning
C403	414455	Software Design and Modelling	1. Define and understand object oriented methodologies, basics of Unified Modeling Language (UML). 2. Analysis of Object oriented process, use case modeling, domain/class, Interaction and Behavior modeling 3. Discuss and design process of business, access and view layer of class design 4. Compute study of GRASP principles and GoF design patterns 5. Study of architectural design principles and guidelines in the various type of application development.
C404	414456	Elective-I	1. To Comprehend the Information Systems and development approaches of intelligent system

			2. To Evaluate and rethink business processes using information systems. 3. To Propose the Framework for business intelligence. 4. To Get acquainted with the Theories, techniques, and considerations for capturing organizational intelligence 5. To align business intelligence with business strategy. 6. To apply the techniques for implementing business intelligence systems.
C405	414457	Elective-II	1. Describe software testing process and to illustrate the role of software tester in software development process. 2. Investigate the scenario and to select the proper testing technique to test the software 3. Explore the test automation concepts and tools and estimation of cost, schedule based on standard metrics. 4. Choose appropriate quality assurance models and develop quality. 5. Describe different software quality assurance trends.

C408	414460	Project Phase-I	1. Student should be able implement their ideas/real time industrial problem/ current applications from their engineering domain. 2. Students should be able to develop plans with help of team members to achieve the project's goals. 3. Student should be able to break work down into tasks and determine appropriate procedures. 4. Student should be able to estimate and cost the human and physical resources required, and make plans to obtain the necessary resources. 5. Student should be able allocate roles with clear lines of responsibility and accountability and learn team work ethics. 6. Student should be able to apply communication skills to effectively promote ideas, goals or products.
C409	414461	Audit Course V Green Computing	1. Understand the concept of green IT and relate it to sustainable development. 2. Apply the green computing practices to save energy. 3. Discuss how the choice of hardware and software can facilitate a more sustainable operation. 4. Use methods and tools to measure energy consumption.
		Audit Course V Statistical Learning Model using R	1. Students will be familiar with concepts related to “data science”, ”analytics”, “machine learning”, etc. These are important topics, and will enable students to embark on highly rewarding careers. 2. Students will capable of learning “big data” concepts on their own

SEMESTER II

Course Code	University Code	Course	Course Outcomes (COs) statement
	Second Year- Information Technology		
C210	207003	Engineering Mathematics -III	1. Solve higher order linear differential equation using appropriate techniques for analyzing electrical circuits. 2. Solve problems related to Fourier transform, Z-Transform and applications to Signal and Image processing.

			3. Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data. 4. Perform vector differentiation and integration to analyze the vector fields. 5. Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital filters and Computer graphics.
C211	214450	Computer Graphics	1. Demonstrate concept of geometric, mathematical and algorithmic concepts necessary for computer graphics. 2. Apply 2D and 3D Graphical transformation on basic geometric primitives. 3. Apply segments, windowing and clipping algorithm for given input polygon. 4. Design and develop graphics applications using modern tools in shading, animation and gaming. 5. Apply mathematical function in generation of curves and fractals.
C212	214451	Processor Architecture and Interfacing	1. Acquire knowledge about architectural details of 80386 microprocessor 2. Understand memory management and multitasking of 80386 microprocessor. 3. Understand architecture and memory organization of 8051 microcontroller. 4. Explain timers and interrupts of 8051 microcontroller and its interfacing with I/O devices.
C213	214452	Data structures and Files	1. Understand Abstract Data Type (ADT) for linear data structures like stack and queue and their implementations. 2. Analyze and implement non-linear data structures like tree and graph and their applications using C++. 3. Understand and apply the concept of tables to database. 4. Apply advanced tree algorithms to solve problems. 5. Implement different file organizations.

C214	214453	Foundations of Communication and Computer Network	1. Recognize data/signal transmission over communication media. 2. Distinguish between usages of various modulation techniques in Communication. 3. Explain error correction and detection techniques and flow control protocols. 4. Analyze various spread spectrum and multiplexing techniques. 5. Acquaint with transmission media and their standards.
Third Year- Information Technology			
C310	314450	Computer Network Technology	1. Classify the routing protocols and analyses how to assign the IP addresses for the given network 2. To implement a network protocol based on socket programming 3. Configure servers by demonstrating different servers with their applications. Describe different wireless technologies and IEEE standards. 4. Analyze Routing Protocols for Ad-hoc Wireless Networks and Implement wireless sensor network. 5. To develop applications on emerging trends in communication networks
C311	314451	System Programming	1. Able to analyze assembly scheme, different loading schemes, design and implement system programs such as assembler, macro processor. 2. Able to design and implement lexical analyzer, and use tool LEX for generation of Lexical Analyzer. 3. Able to study role of parsers and use tool YACC for generation of Syntax Analyzer. 4. Able to study storage allocation, code generation and code optimization issues assessed and applied accordingly.

C312	314452	Design And Analysis of Algorithms	1. To apply proof techniques to prove correctness of problem and to calculate computational complexity for algorithms using asymptotic notations also solve recurrence relations. 2. To apply Divide & Conquer, Greedy and Dynamic programming approach to design and analyze algorithms. 3. To illustrate problems using Backtracking algorithmic strategy. 4. To compare approaches for Branch and Bound strategy 5. To explore the concept of P, NP, NP-complete, NP-Hard and parallel algorithms.
C313	314453	Cloud Computing	1. To describe the need of Cloud based solutions. 2. To explain concept of virtualization and common standards used in implementation of cloud computing. 3. To explain effective techniques to program Cloud Systems. 4. To describe Security Mechanisms and issues in Cloud Applications. 5. To discuss use of ubiquitous clouds in applications of Internet of Things. 6. To explain emerging trends in cloud computing.
C314	314454	Data Science & Big Data Analytics	1. To understand Big Data primitives 2. To learn and apply different mathematical models for Big Data. 3. To understand the different Big data processing technologies. 4. To analyze each learning To understand needs, challenges and techniques for big data visualization. model come from a different algorithmic approach and it will perform differently under different datasets. 5. To learn different programming platforms for big data analytics.
C318	314458	Project Based Seminar	1. To Gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal. 2. To write a technical report summarizing state-of-the-art on an identified topic. 3. Present the study using graphics and multimedia presentations. 4. Define intended future work based on the technical review. 5. To explore and enhance the use of various presentation tools and techniques. 6. To understand scientific approach for literature survey and paper writing.

C319	314449	Audit Course 4 Social Awareness and Governance Program	1. Understand social issues and responsibilities as member of society. 2. Apply social values and ethics in decision making at social or organizational level 3. Promote obstacles in national integration and role of youth for National Integration 4. Demonstrate basic features of Indian Constitution.
Fourth Year- Information Technology			
C410	414462	Distributed Computing System	1. Apply the principles of distributed systems to develop new applications. 2. Develop the interface between different distributed applications using message passing communication techniques. 3. Analyze different Synchronization and Election techniques used in distributed system 4. Analyze different security issues in distributed and multimedia systems
C411	414463	Ubiquitous Computing	1. Demonstrate the knowledge of design of Ubicomp and its applications. 2. Explain smart devices and services used by Ubicomp Systems. 3. Describe the significance of actuators and controllers in real time application design. 4. Explain the concept of HCI in the design of automation applications. 5. Explain taxonomy of Ubicomp privacy and ways of addressing Ubicomp privacy. 6. Describe Ubicomp communication and management.
C412	414464	Elective III	1. Explain what is internet of things. 2. Explain architecture and design of IoT. 3. Describe the objects connected in IoT. 4. Understand the underlying Technologies. 5. Understand the platforms in IoT. 6. Understand cloud interface to IoT.

C413	414465	Elective IV	1. To understand rural development and rural economy of India. 2. To identify different measures and paradigms of rural development 3. To Understand and learn importance of technologies in rural development and use of ICT 4. To learn different measures of community development 5. To learn different forms of rural entrepreneurship. 6. To understand challenges and opportunities in rural development by learning different case studies.
C416	414468	Project Work	1. Learn teamwork. 2. Be well aware about Implementation phase. 3. Get exposure of various types of testing methods and tools. 4. Understand the importance of documentation.
C417	414469	Audit Course-VI	1. Expand your knowledge of Internet of Things. 2. Discover how you can use IoT in your Engineering applications. 3. Build more effective hands on with IoT elements. 4. Expand the practical knowledge of using IoT components like sensors, processors. 5. Expand the understanding of using different protocols.

Department of Electrical Engineering.

Department Vision Mission

Vision

"To be a center of developing competent Electrical Engineer for sustainable industrial and societal growth"

Mission

M1: To develop competent professionals through design and implementation of effective teaching learning process.
M2: To groom students for innovations, entrepreneurships and higher studies by providing appropriate platform.

Program Educational Objective (PEO)

PEO1: Graduate shall possess core competencies in the field of electrical engineering and have an ability to work in diversified environment.

PEO2: Graduate shall have an ability to provide smart sustainable solutions in electrical engineering adopting modern tools and technologies.

PEO3: Graduate shall have abilities of innovation, research & development to solve societal issues in the field of electrical engineering.

Program outcomes

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.
PO 2: Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles ofmathematics, natural sciences, and engineering sciences.
PO 3: Design/Development of Solutions: Design solutions for complex engineering problems and design system componentsor processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.
PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction andmodelling to complex engineering activities with an understanding of the limitations
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 responsibilities relevant to the professional engineering practice.

PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, 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 individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with the society at large, such 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.

PSO: Program specific outcomes addressed by the Course:

PSO1: Able To Apply Professional Skill In Core Field Of Product, Service, Support Engineering And IT Professionals, Problem Solving Skills Like Data Interpretation ,Control System And Software Programming For Successful Employability

PSO2: To Develop The Professionals And Entrepreneurs In Renewable Energy System, Electrical Contracting And Consultancy, Digital Marketing Using Modern Tools And Techniques

PSO3: Able To Engage In Continuous Upgradation To Align with Recent Technology In Electrical Engineering And Peruse Higher Education

Class: SE

Course: Power Generation Technologies **Course Code:** 203141

After the completion of the course, students will be able to

CO201.1	Illustrate operations of thermal, nuclear, diesel and gas power plant with all accessories and cycles.
CO201.2	Identify the components of hydro power plant and solve simple numerical on turbine.
CO201.3	Interpretation of wind based energy generation along with its analysis and

	comparison
CO201.4	Apply the application of solar energy in thermal and electrical power generation.
CO201.5	Explain the operation of electrical energy generation using biomass, tidal, geothermal, hydel plants, fuel cell and interconnection with grid

Course: Engineering Mathematics-III **Course Code:** 207006

After the completion of the course, students will be able

CO202.1	lve higher order linear differential equation using appropriate techniques for analyzing electrical circuits.
CO202.2	Solve problems related to Laplace transform, Fourier transform, Z-transform and applications to Signal and Image processing.
CO202.3	pply Statistical methods like correlation, regression and probability theory as applicable to analyse and interpret experimental data related to energy management,power systems,testing and quality control.
CO202.4	rform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields.
CO202.5	**nalyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatic and signal processing.**

Course: Material Science **Course Code: 203142**

After the completion of the course, students will be able

CO203.1	Categorize and classify different materials from Electrical Engineering applications point of view.
CO203.2	Explain and summarize various properties and characteristics of different classes of materials
CO203.3	Select the materials for application in various electrical equipment.
CO203.4	Explain and describe knowledge of nanotechnology, batteries and solar cell materials.
CO203.5	Categorize and classify different materials from Electrical Engineering applications point of view.

Course: Analog and Digital Electronics **Course Code:** 203143

After the completion of the course, students will be able to:

CO204.1	Understand conversion of number system, perform binary arithmetic and reduce Boolean expressions by K- Map.
CO204.2	Demonstrate basics of various types of Flip flops, design registers and counter.
CO204.3	Analyze parameter of Op-amp and its applications.

CO204.4	Apply the knowledge of Op-amp as wave form generators & filters.
CO204.5	**Use BJT as amplifier with various configurations**
CO204.6	**Analysis of uncontrolled rectifier.**

Course: Electrical Measurements and Instrumentation **Course Code:** 203144

After the completion of the course, students will be able

CO205.1	Categorize the various characteristics of measuring instruments and their range extension technique.
CO205.2	Classify resistances, apply measurement techniques for measurement of resistance, inductance.
CO205.3	Explain construction, working principle and use of dynamometer type wattmeter for measurement of power under balance and unbalance condition.
CO205.4	Explain Construction, working principle of 1-phase and 3-phase induction, static energy meter and calibration procedures.
CO205.5	**Illustrate the use of CRO for measurement of various electrical parameters, importance of transducers, their classification, selection criterion and various applications.**

Course: SOFT SKILLS **Course Code:** 203151

After the completion of the course, students will be able

CO206.1	Do SWOT analysis
CO206.2	Develop presentation and take part in group discussion
CO206.3	Understand and Implement etiquettes in workplace and in society at large.
CO206.4	Work in team with team spirit
CO206.5	Utilize the techniques for time management and stress management

Course: Power System I **Course Code:** 203145

After the completion of the course, students will be able

CO207.1	cognize different patterns of load curve, calculate different factors associated with it and tariff structure for LT and HT consumers.
CO207.2	vare of features, ratings, application of different electrical equipment in power station and selection of overhead line insulators.
CO207.3	Analyze and apply the knowledge of electrical and mechanical design of transmission lines.
CO207.4	Identify and analyze the performance of transmission lines.

Course: Electrical Machines I **Course Code:** 203146

After the completion of the course, students will be able

CO208.1	To explain the construction and energy conversion principles of transformers and AC/ DC motors.
CO208.2	To develop the equivalent circuits of machines.
CO208.3	To evaluate the performance of electrical machines by actual experimenting.
CO208.4	To apply the fundamentals to select the machines for specific applications.

Course: Network Analysis **Course Code:** 203147

After the completion of the course, students will be able

CO209.1	Able to develop strong basics for electrical networks and problem solving by using modern tool and analyzing relevant technique for network in different conditions by application of theorems.
CO209.2	Estimate the performance of the networks and analyze the behavior of its transient response using modern tool ,classical method
CO209.3	Analyze the behavior of its transient response using Laplace transform approach
CO209.4	Implement network concept for analysis of 2-port networks and designing passive filters circuits .

Course: Numerical Methods and Computer Programming **Course Code:** 203148

After the completion of the course, students will be able

CO210.1	Develop algorithms and implement programs using C language for various numerical methods.
CO210.2	Demonstrate types of errors in computation and their causes of occurrence.
CO210.3	Identify various types of equations and apply appropriate numerical method to solve polynomial eq, transcendental eq, interpolation and numerical integration.
CO210.4	Apply and compare various numerical methods to solve first and second order ODE and solve linear simultaneous equations.

Course: Fundamentals of Microcontroller and Applications **Course Code:** 203149

After the completion of the course, students will be able

CO211.1	Illustrate about different types, working of Microcontroller - 8051, Internal architecture, along with Instruction set
CO211.2	Apply the programming skills to program the microcontroller in assembly language
CO211.3	Apply the concepts of timers , interrupts , serial communication of 8051 and programming using assembly language.

CO211.4	Analyze the real time problems and Design & develope interfacing circuits for various applications.

Class: TE

Course: Industrial and Technology Management **Course Code:** 311121

After the completion of the course, students will be able

)301.1	derstand concepts of Technology management and Quality management.
) 301.2	plain importance of quality management and understand use of various assistance tools for quality improvement .
) 301.3	Differentiate between marketing management and financial management and understand various theories of work motivation and group dynamics .
) 301.4	Summarize intellectual property rights and understand concept of patent ,copy rights and trademarks .

Course: Advance Microcontroller and its Applications **Course Code:** 303141

After the completion of the course, students will be able

CO302.1	strate architecture of PIC18F458 microcontroller, its instructions and the addressing modes.
CO302.2	nstruct the program and debug in assembly language or C language for specific applications.
CO302.3	Use of an IDE for simulating the functionalities of PIC microcontroller and its use for software and hardware development.
CO302.4	Identify the Interfacing of microcontroller with various devices.
CO302.5	termine the advance features of microcontroller peripherals in electrical system.

Course: Electrical Machines II **Course Code:** 303142

After the completion of the course, students will be able

CO303.1	ply the knowledge of mathematics to obtain the emf equation of synchronous generator.
CO303.2	Create and simulate the matlab model to understand the speed control of three phase induction motor and give the valid conclusions based on analysis and experiments.
CO303.3	vestigate the performance of the synchronous generator by obtaining the OC & SC test on three phase synchronous generator and formulate the voltage regulation.
CO303.4	Understand the operation, working of single phase induction motor, special machines.

Course: Power Electronics **Course Code:** 303143

After the completion of the course, students will be able

CO304.1	ply the fundamental principles of power electronic device like SCR and GTO and use them with their triggering circuit, protection circuit.
CO304.2	scribe construction and working principle of MOSFET, IGBT, MCT and To classify chopper circuits along with analysis
CO304.3	Analyze single Phase AC to DC converters and evaluate their performance
CO304.4	Analyze three Phase AC to DC converters and AC voltage regulators and evaluate their performance.
CO304.5	alyze single Phase DC to AC inverters and evaluate their performance.
CO304.6	alyze three Phase DC to AC inverters and evaluate their performance.

Course: Electrical Installation, Maintenance and Testing **Course Code:** 303144

After the completion of the course, students will be able

CO305.1	Classify distribution systems, its types and substations
CO305.2	Design of different earthing systems for residential and industrial premises
CO305.3	Select methods of condition monitoring and testing of various Electrical Equipments.
CO305.4	Estimate and Costing of residential and industrial premises.
CO305.5	Summarize the importance of electrical safety.

Course: Seminar and Technical Communication **Course Code:** 303145

After the completion of the course, students will be able

CO306.1	Understand needs of today's world regarding innovations in Electrical engineering.
CO306.2	prove presentation and documentation skill.
CO306.3	Apply theoretical knowledge to actual industrial applications and research activity.
CO306.4	Help to contribute in analysis, planning, management and operation in Electrical engineering.

Course: Power System II **Course Code:** 303146

After the completion of the course, students will be able

CO307.1	To explain the evaluation of ABCD constants and equivalent circuit parameters of Long transmission line
CO307.2	To evaluate the performance & to solve problems involving modeling design of HVDC & EHV-AC power transmission line.
CO307.3	To explain advantages of Per unit system & analyze power flow in power transmission networks.
CO307.4	To explain the calculation of currents & voltages in a faulted power system under both symmetrical & unsymmetrical faults .

Course: Control System I **Course Code:** 303147

After the completion of the course, students will be able

CO308.1	Develop mathematical equation and draw it's equivalent diagram to find transfer function of physical system.
CO308.2	Demonstrate time response of linear system.
CO308.3	Identify various types of methods to find stability of system in time domian & in frequency domain.
CO308.4	Design PID controller for LTI system .

Course: Utilization of Electrical Energy **Course Code:** 303148

After the completion of the course, students will be able

CO309.1	Able to understand principle of electric heating,welding,furnace and it's applications.
CO309.2	Aware about electrochemical process,electrical circuits and design simple residential illumination schemes
CO309.3	Apply knowledge of electric locomotive and calculate tractive efforts,power,acceleration and velocity of traction.
CO309.4	Get knowledge of electric braking methods,control of traction motors,train lighting and signaling system.

Course: Design of Electrical Machines **Course Code:** 303149

After the completion of the course, students will be able

CO310.1	Student will be able to gain thr knowledge of electrical machines with respect to heating and cooling curve
CO310.2	Student will be able to apply various specifications of electrical machines as per IS-2026 (Part -1)

CO310.3	Students will be able to design three phase transformer
CO310.4	Students will be able to determine parameter and performance of three phase transformer
CO310.5	Students will be able to design three phase induction motor by using modern tools
CO310.6	Students will be able to determine parameter and performance of three phase induction motor

Course: Energy Audit and Management **Course Code:** 303150

After the completion of the course, students will be able

CO311.1	Explain the present energy scenario with BEE energy policy and Electricity Act.
CO311.2	Elaborate the energy management roles and resposibilities with energy policies.
CO311.3	Understand the concept of demand managent alongwith different tariffs.
CO311.4	Construct a model of energy audit of various sector.
CO311.5	Generalize energy conservation and demand side measures for electrical, thermal and utility Systems.
CO311.6	Validate financial analysis of simple problems on cost benefit analysis.

Course: Electrical Workshop **Course Code:** 303151

After the completion of the course, students will be able

CO312.1	Integrate electrical/electronic circuits for useful applications
CO312.2	Acquire hardware skills to fabricate circuits designed
CO312.3	Read data manuals/data sheets of different items involved in the circuits
CO312.4	Test and debug circuits
CO312.5	Produce the results of the testing in the form of report

Class: BE

Course: Power System Operation and Control **Course Code: 403141**

After the completion of the course, students will be able

CO401.1	Analyze the dynamics of power system giving emphasis on stability study using equal area criteria and point by point method .
CO401.2	Identify the requirement of reactive power compensation and compensate reactive power using conventional and advanced controllers such as FACTs .
CO401.3	Incorporate the automatic frequency and voltage control strategies for single and two area case and analyze the effects, knowing the necessity of generation control.
CO401.4	Formulate the unit commitment and economic load dispatch problem and solve it using optimization techniques. Analyze interchange of power between interconnected utilities considering reliability aspects of power system.

Course: PLC and SCADA Applications **Course Code: 403142**

After the completion of the course, students will be able

CO402.1	To introduce students with the concept of PLC, generic PLC architecture, I/O modules (Interface) of PLC
CO402.2	To develop ladder logic for PLC application in an industry
CO402.3	Develop architecture of SCADA and explain the importance of SCADA in critical infrastructure.
CO402.4	Develop software program using modern engineering tools and technique for PLC and SCADA

Course: Elective-I Power Quality **Course Code: 403143**

After the completion of the course, students will be able

CO403.1	Describe power quality issues in Power system.
CO403.2	Determine the causes of voltage sag and estimate magnitude of voltage sag in power system.
CO403.3	List out the sources of transient over voltages and outline the various techniques for overvoltage protection and flickering mitigation techniques
CO403.4	Illustrate the concept of harmonic distortion and list out the effect of harmonic distortion.
CO403.5	Estimate the total harmonic distortion and parameters for passive harmonic filter.
CO403.6	Illustrate the power quality measurement devices with the guidelines in power system.

Course: Elective-II Restructuring and Deregulation **Course Code: 403144**

After the completion of the course, students will be able

CO404.1	Enlist the functions of various key entities in India and explain the implications of various policies and acts on restructuring and deregulation.
CO404.2	Evaluate the process of restructuring of power system
CO404.3	Classify various cost components in generation, transmission, distribution sector and tariff
CO404.4	Explain different power sector restructuring model .
CO404.5	Describe different types of electricity markets
CO404.6	Illustrate pricing and transmission rights of electricity along with fundamental concept of congestion management

Course: Control System II **Course Code: 403145**

After the completion of the course, students will be able

CO405.1	scribe the basic digital control system, sampling and reconstruction .
CO405.2	press a system in the state space format.
CO405.3	lve the state equation and familiarize with STM and its properties.
CO405.4	sign a control system using state space techniques including state feedback control and full order observer.

Course: Project I **Course Code: 403146**

After the completion of the course, students will be able

CO406.1	Design project for public health, safety ,cultural, societal, environmental consideration applying engineering knowledge.
CO406.2	Inculcate the knowledge of project management, finance with communicating effectively on complex engineering activity with documentation ,presentation and sharing instruction.
CO406.3	Engage in independent and life long learning by functioning effectively in teamwork along with professional ethics and team work
CO406.4	alyse methods including design of hardware and using model tools for validation of hardware.

Course: Switchgear and Protection **Course Code: 403147**

After the completion of the course, students will be able

CO407.1	Describe the fundamentals of protective relaying and theory of arc interruption.
CO407.2	Categorize types of circuit breaker based on ratings.
CO407.3	Estimate the causes and effects of overvoltage due to lightning on protection.
CO407.4	Estimate the faults in transformer, alternator, 3 phase induction motor and its protection.

Course: Power Electronic Controlled Drives **Course Code: 403148**

After the completion of the course, students will be able

CO408.1	Apply the basic concepts of drive and identify the importance of electrical drives in industries
CO408.2	Classify the various types of loads and their characteristics in the industries
CO408.3	solve the basic problems on motor –load dynamics and multiquadrant operation
CO408.4	Apply electric braking and its types, impart the practical knowledge by solving numericals
CO408.5	explain the solid state control methods of DC motors, 3 phase induction motors, BLDC and PMSM motors.
CO408.6	To enable students to apply the fundamentals of machines and power electronics in the industrial applications and develop their analytical skills

Course: Elective-III- HVDC and FACTS **Course Code: 403149**

After the completion of the course, students will be able

CO409.1	Compare HVDC and EHV AC systems for various aspects
CO409.2	"Reproduce the layout of HVDC system with various components including protective devices"
CO409.3	Differentiate VSC HVDC and conventional HVDC system
CO409.4	Differentiate various types of Power Electronic Controllers
CO409.5	Analyze modeling of FACTs Controllers
CO409.6	Simulate various controllers and HVDC systems using softwares

Course: Elective-IV Smart Grid **Course Code: 403150**

After the completion of the course, students will be able

C410.1	Apply the knowledge to differentiate between Conventional and Smart Grid.

	the need of Smart Grid
C410.2	Illustrate the Smart storage and Hybrid Vehicles
C410.3	Classify the Smart metering, Home Automation, Smart Communication, and GIS.
C410.4	Explain the issues of micro grid.
C410.5	Solve the Power Quality problems in smart grid.
C410.6	Apply the communication technology in smart grid

Course: Project II **Course Code: 403151**

After the completion of the course, students will be able

C411.1	Design project for public health, safety ,cultural, societal, environmental consideration applying engineering knowledge.
C411.2	Inculcate the knowledge of project management, finance with communicating effectively on complex engineering activity with documentation ,presentation and sharing instruction.
C411.3	Engage in independent and life long learning by functioning effectively in teamwork along with professional ethics and team work
C411.4	Analyse methods including design of hardware and using model tools for validation of hardware.

Department of Mechanical Engineering

Vision

To be recognized globally as a center of quality education and research for aspiring mechanical engineer to cater to the ever changing demands of industry and society

Mission

M1: To develop responsible mechanical engineers with strong technical skills to meet the needs of the profession and society.

M2: To develop the problem solving & research abilities in the students to meet the needs of the demanding challenges of society and other interdisciplinary areas.

M3: To inculcate moral values, leadership and professional skills for a long productive & influencing professional career.

Department of Mechanical Engineering

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: The graduates will have a successful career in mechanical engineering with strong technical, research & professional skills.

PEO2: The graduates will possess an ability to work in diversified fields along with team work and leadership qualities.

PEO3: The graduates will continue to learn and to adapt in a society of constantly evolving technological environment.

Department of Mechanical Engineering

PROGRAMME OUTCOMES

Engineering Graduates will be able to:

1	Engineering knowledge	Apply the knowledge of mathematics science engineering fundamentals and mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems engineering problems.
2	Problem analysis	Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	Design/development of solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	Conduct investigations of complex problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	Modern tool 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 limitations.
6	The engineer and society	Apply reasoning informed by Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	Environment and sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development and need for sustainable development.
8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and team Work	Function effectively as an individual and as a member or leader in diverse teams and individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11	Project management and finance	Demonstrate knowledge and understanding of the engineering and 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.
12	Life-long learning	Recognize the need for and have the Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES

Mechanical Engineering Graduates will be able to:

1	**PSO1:** Specify, design and evaluate mechanical components and systems using modelling and analysis software.
2	**PSO2:** Apply knowledge of machines, tools, automation, properties of advanced materials and modern management methods for manufacturing of mechanical components and systems.
3	**PSO3:** Apply core aspects of thermal and fluid engineering to determine the performance of mechanical systems including power absorbing and power generating systems.

Department of Mechanical Engineering

COURSE OUTCOMES

Academic year 2018-19

SEMESTER I

Course Code	University Code	Course	Course Outcomes (COs) statement
	Second Year- Mechanical Engineering		
C201	207002	Engineering Mathematics – III	11. Determine the solution for higher order linear differential equations and applying to modeling and analyzing mass spring systems. 12. Apply Laplace transform and Fourier transform techniques to solve differential equations involved in Vibration theory, Heat transfer and related engineering applications. 13. Apply statistical methods like correlation, regression analysis in analyzing, interpreting experimental data and probability theory in testing and quality control. 14. Perform vector differentiation for the vector fields and apply to fluid flow problems. 15. Solve vector integration for finding areas, surface areas and volumes of different objects. 16. Apply various partial differential equations to solve wave equations, one and two dimensional heat flow equations.
C202	202041	Manufacturing Process-I	6. Describe Principles of sand casting Processes and special casting processes with their Advantages, Limitations and Applications. 7. Explain & Relate given process parameters and their effects on hot & cold working of Metals. 8. Describe process parameters and equipment for plastic manufacturing processes and their significance. 9. Explain metal joining processes with respect to material Properties and applications. 10. Describe components of press tool and design sheet layout, force calculation, power for cutting sheet metals. 11. Explain the basic principles, operations performed on the lathe machine and calculating parameters encountered in machining operations.
C204	202043	Thermodynamics	7. Apply fundamentals of thermodynamics, laws of thermodynamics, SFEE, concept of irreversibility to real systems. 8. Explain ideal gas processes to estimate heat, work and change in internal energy, enthalpy & study principle of entropy. 9. Estimate performance of various thermodynamic gas power cycles, gas refrigeration cycle & study the

			principle of availability. 10. Determine the performance of vapor power cycle, vapor refrigeration cycle by studying properties of steam for calculating work and heat transfer during phase change process. 11. Explain classification, working of boiler to determine the performance of steam generators & estimate height of chimney for natural draught in boiler plants. 12. Determine various properties of moist air and analysis of psychometric processes using psychometric charts to achieve human comfort.
C205	214444	Material Science	12. Discuss the basic concept of Crystal systems and detailed morphology of metals and materials. 13. Classify the crystal imperfections in solids to understand the deformation mechanisms in materials - slip, twinning mechanism. 14. Identify the suitable Destructive/ Nondestructive testing method for materials used in Industrial applications. 15. Explain Corrosion, its classification and its prevention methods in detail for enhancing the metal life in industrial applications.. 16. Classify surface modification methods used in industrial applications. 17. Discuss the basic concept of Powder Metallurgy process and Identify the suitable manufacturing technique for special purpose products through powder metallurgy technique.
C206	202051	Strength of Materials	5. Calculate simple stress and strain for determinate, indeterminate, homogeneous and composite bars under uniaxial or multiaxial loading. 6. Draw shear force diagram and bending moment diagram for beam with given loading conditions to locate point of contraflexure or contrashear. 7. Determine bending and shear stresses for beam with given loading conditions to show bending and shear stress distribution in beam section. 8. Calculate maximum slope and deflection for beam with given loading conditions; determine strain energy due to axial loading, bending and torsion. 9. Compute torsional shear stresses, deformations in determinate and indeterminate shafts subjected to twisting moment using torsion equation; determine critical load for columns using Euler or Rankine formula. 10. Determine principal stresses, strains and planes under combined bending and shear loading using analytical and Mohr's circle method with application of theories of elastic failure.

SEMESTER II

Course Code	University Code	Course	Course Outcomes (COs) statement
	Second Year- Mechanical		

	Engineering		
C207	202045	Fluid Mechanics	1. "Determine viscosity, surface tension, compressibility and capillary rise or fall of liquid for temperature encountered in fluid engineering problems." 2. Determine total pressure, center of pressure on plane and curved surfaces encountered in dam structures, and metacentric height of floating & submerged body in a static fluid. 3. Identify types of fluid flow and calculate velocity, acceleration, stream function and velocity potential at any point in fluid flow. 4. Calculate pressure drop, rate of flow in a close conduit using Bernoulli's and continuity equations. 5. Determine velocity, shear stress and frictional pressure drop in a laminar flow between two parallel plates and in a pipe using derived equations. 6. Compute major and minor losses in a pipe network using Darcy Weisbatch and empirical equations. 7. Construct mathematical correlation for complex flow phenomenon in terms of dimensionless parameters. 8. "Determine boundary layer thicknesses, drag and lift for air flow over thin flat plate, cylinder, sphere and airfoil shapes."
C209	202048	Theory of Machines – I	1. Demonstrate the working of planar mechanisms to be used in automobiles and machine tools. 2. Determine the mass moment of inertia of rigid bodies having symmetric and intricate shape used in automobiles and machine tools. 3. Determine static and dynamic forces on components of slider crank mechanism of an I. C. Engine mechanism. 4. Determine torque transmitting capacity of Clutch, Brake and Dynamometer used in automobiles and machine tools. 5. Determine velocity and acceleration of simple mechanism by analytical and graphical methods.
C210	202049	Engineering Metallurgy	1. Design the Equilibrium Diagram by understanding basic concepts of Metallurgy 2. Demonstrate the sample preparation procedure for Metallography & Understand Macro & Micro structure for various metals for Industrial applications.. 3. Apply the knowledge of Iron Carbon alloy system and its applications. 4. Distinguish the suitable heat treatment processes for different steels. 5. Identify the specific grades of steels and their industrial applications 6. Classify the various nonferrous metals & their alloys for industrial applications.
C211	202050	Applied Thermodynamics	1. Explain I.C engines working principle materials used along with losses encountered in fuel air and actual cycle.

			2. Exemplify requirements of carburation, stages of combustion in SI engines, theory of abnormal combustion and combustion chambers for SI engine. 3. Explain fuel injection system, stages of combustion in CI engines, theory of abnormal combustion and combustion chambers for CI engine. 4. Measure performance of IC engines experimentally and theoretically for different loading conditions. 5. Explain systems necessary for efficient operation of IC engines with emissions, norms and controlling techniques. 6. Explain working of air compressors and evaluation of performance for reciprocating air compressor.

SEMESTER I

Third Year- Mechanical Engineering			
C301	302041	Design of Machine Elements -I	6. Determine dimensions of simple machines elements like cotter and knuckle joints, Bell crank levers and elements subjected to eccentric loading like frame of a C-Clamp 7. Estimate dimensions of shafts (by ASME code), keys and couplings for power transmission application 8. Investigate and determine fluctuating stress with respect to finite and infinite life of component under simple and combined loading conditions like transmission shafts using Modified Goodman Criterion 9. Design Power Screws applications like Screw Jack and C-clamp. 10. Design threaded and welded joints subjected to eccentric loads like Jib Headed Cranes 11. Design Helical and Leaf springs used in valves and automobiles.
C302	302042	Heat Transfer	6. Analyze the various modes of heat transfer and apply heat conduction equations for thermal systems with and without internal heat generation. 7. Apply the conduction equation to different types of fins to evaluate its performance. 8. Apply the general heat conduction equation to thermal systems for transient condition using lumped system analysis. 9. Calculate the convective heat transfer rate over plate and through pipe application using empirical co-relation and understand the phenomena of boiling. 10. Evaluate the radiation heat exchange between the surfaces for application in radiation shield of furnaces. 11. Compute the efficiency and effectiveness of heat

			exchanger using LMTD and ϵ-NTU method.
C303	302043	Theory of Machines-II	7. Calculate the design parameters of spur gear to avoid interference used in machine tools and automobile applications. 8. Estimate forces and torque acting on Helical, Bevel, Worm and Worm Wheel used in machine tools and automobile applications. 9. Determine speed and torque in epi-cyclic gear trains used in gear box. 10. Generate cam profile for given follower motions to avoid cam jump. 11. Synthesize four bar mechanism with analytical and graphical methods. 12. Determine Gyroscopic couple or its effect for stabilization of dynamic applications cars, ships, and aeroplane. 13. Distinguish between stepped and step-less drive for automobile applications.
C304	302044	Turbo Machines	5. Classify turbo machines along with its applications and evaluate performance parameters for flat, inclined plate, curved vane and series of vanes. 6. Analyse impulse water turbine with design aspects, selection criteria, performance parameters and characteristics for its use in hydroelectric power plant. 7. Evaluate performance parameters of reaction water turbines & draft tube along with discussion of governing mechanism & dimensional analysis. 8. Evaluate performance parameters of impulse, and reaction steam turbine along with discussion of nozzles, governing mechanism, selection & losses. 9. Evaluate performance parameters of single & multistage centrifugal pumps along with discussion of cavitation, selection & dimensional analysis. 10. Evaluate performance parameters of centrifugal compressor along with discussion of theoretical aspect of axial compressor
C305	302045	Metrology and Quality Control	7. Select tool and techniques to determine geometry and dimensions and describe gauges to meet desired needs within realistic constraints. 8. Describe measuring parameter of gear and threads using pneumatic and mechanical comparator also explain different surface roughness parameter. 9. Determine geometry and dimensions of components in engineering applications using CMM tools and techniques. 10. Explain the importance of quality control tools in manufacturing and industrial engineering applications. 11. Explain the concepts of basic sampling and acceptance for SQC to plot different statistical

			curves. 12. Describe ideas of 5S, Kaizen, Kanban and its applications in engineering industries for continuous improvement process.
C306	302046	Skill Development	1. To assemble, disassemble and part drawing of tail stock used in machine shop. 2. To assemble, disassemble and part drawing of valve (PRV, Sluice valve, Steam stop valve) assembly used in fluid machinery. 3. To assemble, disassemble and part drawing of I.C. Engine (4 stroke single cylinder) assembly used in two wheeler. 4. To assemble, disassemble and part drawing of hydraulic actuator used in fluid machinery. 5. To assemble, disassemble and part drawing of hermetically sealed compressor used in refrigeration and air conditioning system. 6. To assemble, disassemble and part drawing of industrial gear box used in automobiles and machine tool.

SEMESTER II

Third Year- Mechanical Engineering			
C307	302047	Numerical Methods and Optimization	1. Evaluate the roots of equations and simultaneous equations in engineering applications using iterative approach with minimised error. 2. Apply graphical, simplex and Newton's optimisation method to solve constrained and unconstrained engineering problems. 3. Apply given numerical techniques to solve ordinary differential equations (ODE) and partial differential equations (PDE). 4. Apply Lagrange's & Newton's forward interpolation method for regression analysis, and fit different curves by least square technique. 5. Evaluate integration of functions using single and double integration numerical techniques.
C308	302048	Design of Machine Elements-II	1. Determine module of Spur Gears to avoid bending and pitting failure for constant speed gear boxes. 2. Calculate normal module for Helical Gears and module at the larger end for Bevel Gears. 3. Estimate dynamic load rating capacity of rolling contact bearings used in transmission systems based on applied load and expected life. 4. Compute efficiency, module, diametral quotient and speed ratio for worm drive used in Industrial Applications 5. Carry out selection of belt drives from

			manufacturing catalogue for Industrial applications and Explain theory of chain and rope drives. 6. Determine quantity of lubrication required for sliding contact bearings to ensure proper heat dissipation
C309	302049	Refrigeration and Air Conditioning	1. Discuss the applications of refrigeration and air-conditioning and describe refrigerants used in refrigeration & air conditioning systems with their classes, properties, environmental issues, etc. 2. Determine performance parameters of simple vapour compression systems using property tables, p-h charts. 3. Describe working of simple, actual, Li-Br, three fluid vapour absorption refrigeration system. 4. Determine the performance parameters of multiple-pressure vapour compression systems using p-h charts and discuss introduction to Linde Hampson cycle. 5. Determine properties of moist air and psychrometric process parameters using psychrometric chart at standard atmospheric condition and illustrate thermodynamics of human body, comfort and comfort chart. 6. Explain components of refrigeration and air-conditioning systems for domestic and commercial applications. 7. Determine pressure losses & size of duct for flow through simple duct system.
C310	302050	Mechatronics	1. Determine Sensitivity, Precision and Resolution for sensors used in measurement systems. 2. Construct block diagram using key elements of mechatronics system for household and industrial applications and Carry out block diagram reduction. 3. Understand Signal Processing and Interfacing of Sensors and Actuators to Data Acquisition System to Determine resolution of ADC/DAC. 4. Develop PLC program for household and industrial applications. 5. Determine the system stability based on time and frequency domain for mechatronics system. 6. Determine controller output using Proportional, Integral, Derivative and combinational actions to reduce system errors.
C311	302051	Manufacturing -Process-II	1. Determine the force(s) acting on SPCT, Material Removal Rate (MRR),Cutting power, Total power, specific and tool life (using Taylor's tool life equation) 2. Determine machining time in drilling, milling and broaching machine with their applications. 3. Explain grinding machines, grinding wheels and super finishing processes including Honing,

			Lapping, Buffing and Burnishing 4. Explain advanced machining process – EDM, LBM, AJM, USM, and ECM withtheir Principles, Working, Process Parameters, Advantages, Limitations and Application. 5. Compute part programs for simple jobs on CNC machines with Construction working of NC, CNC, DNC and machining center, CNC axes and drives, ATC, APC 6. Draw Jigs & Fixtures for simple components with help of elements, Location guidelines, Principles of clamping & guiding
C313	302053	Seminar	1. Explain reviews of research literature published in reputed journals. 2. Apply techniques of effective ways of written communication acceptable to journal standards. 3. Demostrate depth of understanding of solution of engineering problems written in reputed journals. 4. Explain the impact of concept in societal, environmental contexts 5. Apply techniques, resource and modern engineering tools to solve complex engineering problem

SEMESTER I

	Fourth Year Mechanical Engineering		
C401	402041	Hydraulics and Pneumatics	5. Calculate the Power and Efficiency of positive displacement pumps using basics of Fluid Power. 6. Determine the performance parameters of Actuator and Accumulator of Hydraulic system. 7. Explain construction and working of types of Fluid Power Control Valves 8. Draw the circuit diagram of hydraulic system used in Industrial Applications. 9. Illustrate the components, control valves and circuits of the Pneumatic system 10. Describe the design of hydraulic and Pneumatics circuit using manufacturers catalogue and simulation using any suitable software.
C402	402042	CAD CAM Automation	6. Determine the result of geometrical transformations on 2D objects using homogeneous transformation matrix. 7. Formulate mathematical expression of analytical and synthetic curves, surfaces and Select appropriate analytical and synthetic curves and surfaces in part modelling. 8. Construct and Analyze structural problem of Mechanical systems for safe working conditions using FEA software and validate the same by classical approach. 9. Create a CNC part program and tool path in CAM software for Turning/ Milling using FANUC control. 10. Explain various Additive Manufacturing process and design and development of product using rapid prototyping. 11. Explain the robotics system and Development of Automated system using Ardiuno interfacing.
C403	402043	Dynamics of Machinery	6. Estimate natural frequency for single DOF undamped & damped free vibratory systems. 7. Determine response to forced vibrations due to harmonic excitation, base excitation and excitation due to unbalance forces. 8. Estimate natural frequencies, mode shapes for 2 DOF undamped free longitudinal and torsional vibratory systems. 9. Apply balancing technique for static and dynamic balancing of multi cylinder inline and radial engines. 10. Describe vibration measuring instruments for industrial / real life applications along with suitable method for vibration control. 11. Explain noise, its measurement & noise reduction techniques for industry and day today life problems.

C404	402044 A [C404 A]	Elective-I FEA	7. Understand the Fundamentals concept of FEA & Techniques used to solve mechanical engineering problems. 8. Analyze 1D element structural problems involving bars, beams, trusses. 9. Derive and use 2-D element stiffness matrices and load vectors to solve for displacements and stresses. 10. Analyze 2D elements for triangular, quadrilateral, iso-parametric Element. 11. Analyze steady state heat transfer problems. 12. Compute dynamic problems consisting bar, beam element and interpret the result of 3D element structural problems using commercial FEA package.
C412	402044 C [C404 C]	Elective-II HVAC	6. Determine the performance parameters of transcritical & ejector systems used in refrigeration & air-conditioning applications. 7. Estimate thermal performance of compressor, evaporator, condenser and cooling tower used in refrigeration systems. 8. Describe refrigerant piping design, capacity & safety controls and balancing of vapour compressor system. 9. Explain importance of indoor and outdoor design conditions, IAQ, ventilation and air distribution system used in central air conditioning systems 10. Estimate heat transmission through building walls using CLTD and decrement factor &time lag methods with energy-efficient and cost-effective measures for building envelope load of AC system. 11. Explain working of types of desiccant, evaporative, thermal storage, radiant cooling, clean room and and formulate mathematical model of air-conditioning system.

SEMESTER II

Course Code	University Code	Course	Course Outcomes (COs) statement
	Final Year- Mechanical Engineering		
C407	402047	Energy Engineering	6. Illustrate thermal power plant system and cogeneration power plant with detailed explanation of each component depending upon global energy scenario, present status and future scope of power generation in India 7. Associate and discuss types of steam condenser used in thermal power plant and environmental impact of thermal power plant 8. Compute theoretical aspects, geological considerations and types of components for hydroelectric and nuclear power plant with economic consideration 9. Estimate performance parameter of gas turbine power plant and diesel power plant with their configuration 10. Discuss types of Non-conventional power plant and their commercialization 11. Associate and discuss types of electrical instruments used in power plant and Estimate miscellaneous cost and performances incorporated with types of power generation system
C408	402048	Mechanical System Design	6. Analyze and design machine tool gear box, cylinder, pressure vessel and I.C. engine components for stated specifications. 7. Apply the statistical considerations in design to analyze the defects and failure modes in industrial product. 8. Design suitable material handling system for bulk load. 9. Develop the optimum solutions for weight, cost, and size, stiffness using Johnson's method for shaft, helical spring, and pressure vessel.
C409	402049	ELE-III TRIBO	5. Understand the practical aspect of tribology in industry 6. Describe theories, laws, measurement of friction and wear. 7. Analyze hydrodynamic bearing and performance using derived equations. 8. Determine performance of hydrodynamic bearing using derived equations. 9. Explain characteristics of Elasto-hydrodynamic lubrication and Gas Lubrication 10. Apply the principles of surface engineering for different applications of

			tribology
C415	402049 B [C409 B]	ELE-III IE	6. Describe different aspect of industrial engineering and productivity improvement techniques. 7. Apply different concepts of method study to improve the work content. 8. Describe and analyze techniques of work measurement and time study. 9. Illustrate different aspect of work system design and production planning control. 10. Identify various cost accounting and financial management practices applicable in different industries. 11. Apply concept of engineering economy, ergonomics and industrial safety practices.
C416	402050 C [C410 C]	ELE-IV PDD	1. Describe fundamentals of Product design and development process, understand conventional and recent trends of Product design and development process 2. Identify & formulate customer needs and its tools for the product design & development. Explain mission statement, forecasting. 3. Describe information gathering for product development like brain storming, lateral thinking and morphological analysis for product development 4. Demonstrate reverse and forward engineering in product development by using teardown process. Explain Benchmarking for the product development process 5. Describe conceptually design processes as DFA, DFMEA, design for safety etc. also cost analysis for the effective cost of the product. 6. Explain Product life cycle and management and data management concepts.

DEPARTMENT OF COMPUTER ENGINEERING

PROGRAM SPECIFIC OUTCOME (PSOs)

PSO1 Specify, Design,Develop and Test the software system in the areas of computer networking, database management, Embedded system, Image processing, Big data, etc. to satisfy customer requirements.

PSO2 Analyze and optimize the given algorithms or systems for performance improvements.

PSO3 Design hardware and software for concurrent and parallel programming

HPC	C401 Year of Study:2019-20(SEM-I)
C401.1	Describe different parallel architectures, inter-connect networks, programming models
C401.2	Develop an efficient parallel algorithm to solve given problem
C401.3	Analyze and measure performance of modern parallel computing systems
C401.4	Build the logic to parallelize the programming task
AI&R	C402 Year of Study:2019-20(SEM-I)
C402.1	Identify and apply suitable Intelligent agents for various AI applications.
C402.2	Design smart system using different informed search / uninformed search or heuristic approaches.
C402.3	Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem.
C402.4	Apply the suitable algorithms to solve AI problems.
C402.5	Implement crypto-arithmetic problems using AI.
C402.6	Design and Implement mini project using AI.
DA	C403 Year of Study:2019-20(SEM-I)
C403.1	Write case studies in Business Analytic and Intelligence using mathematical models
C403.2	Present a survey on applications for Business Analytic and Intelligence
C403.3	Provide problem solutions for multi-core or distributed, concurrent/Parallel environments
ELE I-DMW	C404 Year of Study:2019-20(SEM-I)
C404.1	Apply basic, intermediate and advanced techniques to mine the data
C404.2	Analyze the output generated by the process of data mining

C404.3	Explore the hidden patterns in the data
C404.4	Optimize the mining process by choosing best data mining technique
ELE II - MC	C405 Year of Study:2019-20(SEM-I)
C405.1	Justify the Mobile Network performance parameters and design decisions
C405.2	Choose the modulation technique for setting up mobile network.
C405.3	Formulate GSM/CDMA mobile network layout considering futuristic requirements which conforms to the technology.
C405.4	Use the 3G/4G technology based network with bandwidth capacity planning.
C405.5	Percept to the requirements of next generation mobile network and mobile applications.
PWS-I	C408 Year of Study:2019-20(SEM-I)
C408.1	Solve real life problems by applying knowledge.
C408.2	Analyze alternative approaches, apply and use most appropriate one for feasible solution
C408.3	Write precise reports and technical documents in a nutshell.
C408.4	Participate effectively in multi-disciplinary and heterogeneous teams exhibiting team work, Inter-personal relationships, conflict management and leadership quality.
C408.5	To publish Conference paper
ML	C408 Year of Study:2019-20(SEM-II)
C409.1	Distinguish different learning based applications
C409.2	Apply different preprocessing methods to prepare training data set for machine learning.
C409.3	Design and implement supervised and unsupervised machine learning algorithm
C409.4	Implement different learning models
C409.5	Learn Meta classifiers and deep learning concepts
ICS	C410 Year of Study:2019-20(SEM-II)
C410.1	Gauge the security protections and limitations provided by today's technology.
C410.2	Identify information security and cyber security threats.
C410.3	Analyze threats in order to protect or defend it in cyberspace from cyber-attacks.
C410.4	Build appropriate security solutions against cyber-attacks.
EL-III(ERTOS)	C411 Year of Study:2019-20(SEM-II)
C411.1	Recognize and classify embedded and real-time systems
C411.2	Explain communication bus protocols used for embedded and real-time systems
C411.3	Classify and exemplify scheduling algorithms
C411.4	Apply software development process to a given RTOS application

C411.5	Design a given RTOS based application C
EL-IV(CC)	C412 Year of Study:2019-20(SEM-II)
C412.1	To install cloud computing environments.
C412.2	To develop any one type of cloud
C412.3	To explore future trends of cloud computing
PWS-II	C413 Year of Study:2019-20(SEM-II)
C413.1	Show evidence of independent investigation
C413.2	Critically analyze the results and their interpretation.
C413.3	Report and present the original results in an orderly way and placing the open questions in the right perspective
C413.4	Link techniques and results from literature as well as actual research and future research lines with the research
C413.5	Appreciate practical implications and constraints of the specialist subject

TOC	C301 Year of Study:2019-20(SEM-I)
C301.1	to subdivide problems space based on input subdivision using constraints, grammar
C301.2	to design deterministic turing machine for all input all output , NP Complete
C301.3	to design non deterministic turing machine for all input all output, NP Hard
DBMS	C302 Year of Study:2019-20(SEM-I)
C302.1	Design E-R Model for given requirements and convert the same into database tables.
C302.2	Use database techniques such as SQL & PL/SQL.
C302.3	Use modern database techniques such as NOSQL
C302.4	Explain transaction Management in relational database System.
C302.5	Describe different database architecture and analyses the use of appropriate architecture in real time environment.
C302.6	Use advanced database Programming concepts Big Data – HADOOP
SE& PM	C303 Year of Study:2019-20(SEM-I)
C303.1	Selection of s/w processing model for s/w system by comparing models
C303.2	Analyze the s/w Requirement & carryout feasibility study.
C303.3	Design s/w system using appropriate method.
C303.4	Plan, schedule and execute a project considering the risk management.
C303.5	Scheduling & Planning of s/w system for Risk Management & Cost Estimation
C303.6	Plan, schedule and execute testing
IS & EE	C304 Year of Study:2019-20(SEM-I)
C304.1	Understand the importance of an information system to an organization

C304.2	Understand activities in managing ,designing, planning, implementation and deployment of computerized system in Information System to an organization
C304.3	Student would be aware of various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions in any organizations
C304.4	Outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry.
C304.5	Evaluate present worth, future worth and annual worth analyses ,economic alternatives
C304.6	Evaluate benefit/cost, lifecycle and breakeven analysis on one or more economic alternatives
CN	C305 Year of Study:2019-20(SEM-I)
C305.1	Ability to study Physical layer devices and logical link layer Protocols, architecture and its functionality.
C305.2	Ability to analysis of MAC layer protocols and Qos parameters in Networks.
C305.3	Able to learn and understand the transport and application layer protocols and Technologies.
SDL	C306 Year of Study:2019-20(SEM-I)
C306.1	Evaluate problems and analyze data using current technologies in a wide variety of business and organizational contexts.
C306.2	Create data-driven web applications
C306.3	Incorporate best practices for building applications
C306.4	Employ Integrated Development Environment(IDE) for implementing and testing of software solution
C306.5	Construct software solutions by evaluating alternate architectural patterns.
CN LAB	C308 Year of Study:2019-20(SEM-I)
C308.1	Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, topologies, transmission mediums, and technologies
C308.2	Demonstrate design issues, flow control and error control • Analyze data flow between TCP/IP model using Application, Transport and Network Layer Proto
C308.3	Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user commu
C308.4	Illustrate Client-Server architectures and prototypes by the means of correct standards and technol
C308.5	Demonstrate different routing and switching algorithms
DAA	C309 Year of Study:2019-20(SEM-II)
C309.1	Describe various aspects of algorithm and analyze the asymptotic performance of algorithms

C309.2	Describe different models and solve problems using greedy strategy.
C309.3	Describe and apply different algorithmic design techniques.
C309.4	Classify different types of problems and analyze performance with the help of complexity theory
C309.5	Describe Amortized analysis, Embedded algorithms and solve the problems using randomized and approximation algorithms.
C309.6	Apply and analyze Multithreaded, Distributed algorithm and string matching algorithms.

SP&OS	C310 Year of Study:2019-20(SEM-II)
C310.1	Able to analyze system softwares like editors, loaders, assemblers, debuggers & compilers.
C310.2	Able to analyze macro processors, linkers and loaders.
C310.3	Able to use tools like lex and yacc.
C310.4	Able to understand OS types, process scheduling and deadlocks.
C310.5	Able to understand & apply memory management techniques.
C310.6	Able to understand I/O management techniques.

ES&IOT	C311 Year of Study:2019-20(SEM-II)
C311.1	**Implement an architectural design for IoT for specified requirement**
C311.2	Solve the given societal challenge using IoT
C311.3	Choose between available technologies and devices for stated IoT challenge

SDM	C312 Year of Study:2019-20(SEM-II)
C312.1	Analyze the problem statement (SRS) and choose proper design technique for designing web- based/ desktop application
C312.2	Design an application using UML Staticmodeling as fundamental tool.
C312.3	Design an application using UML Dynamic modeling as fundamental tool.
C312.4	Decide appropriate modern tool for designing and modeling
C312.5	Apply design patterns to understand reusability in OO design.
C312.6	Apply appropriate modern testing tool for testing web-based/desktop application

WT	C313 Year of Study:2019-20(SEM-II)
C313.1	Analyze given assignment to select sustainable web development design methodology.
C313.2	Develop web based application using suitable client side and server side web technologies
C313.3	Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management

SEMINAR	C314 Year of Study:2019-20(SEM-II)
C314.1	be able to be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation. •
C314.2	be able to improve skills to read, understand, and interpret material on technology.
C314.3	improve communication and writing skills

WT LAB	C315 Year of Study:2019-20(SEM-II)
C315.1	Analyze given assignment to select sustainable web development design methodology.
C315.2	Develop web based application using suitable client side and server side web technologies
C315.3	Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management

SPOS LAB	C316 Year of Study:2019-20(SEM-II)
C316.1	Able to analyze system softwares like editors, loaders, assemblers, debuggers & compilers.
C316.2	Able to analyze macro processors, linkers and loaders.
C316.3	Able to use tools like lex and yacc.
C316.4	Able to understand OS types, process scheduling and deadlocks.
C316.5	Able to understand & apply memory management techniques.
C316.6	Able to understand I/O management techniques.

ESIOT LAB	C317 Year of Study:2019-20(SEM-II)
C317.1	Design the minimum system for sensor based application
C317.2	Solve the problems related to the primitive needs using IoT
C317.3	Develop full fledged IoT application for distributed environment

DM	C201 Year of Study:2019-20(SEM-I)
C201.1	Illustrate concept of set theory, proposition & mathematical induction.
C201.2	Discuss the basic concepts associated with relation, functions and their applications.
C201.3	Explaining possible outcomes of elementary combinatorial processes such as permutation and combination and calculating the probabilities.
C201.4	Explain concept in graph theory &apply algorithm to solve various mathematical problems.
C201.5	Illustrate basic terminology in trees & apply algorithms to find minimum spanning tree.
C201.6	To identify and prove the properties of groups and rings

DELD	C202 Year of Study:2019-20(SEM-I)
C202.1	Design and implement Boolean Algebraic assignments and Combinational digital circuits as per the specifications.
C202.2	Design and implement Sequential digital circuits as per the specifications.
C202.3	Construct ASM Chart and Design the minimum systems using VHDL
C202.4	Designing Combinational Circuits and Sequential Circuits using PLD's
C202.5	Apply the knowledge to select the logic families IC packages as per the design specifications
C202.6	Develop minimum embedded system for simple real world application
DSA	C203 Year of Study:2019-20(SEM-I)
C203.1	Able to analyze different problems and Apply algorithmic strategy for efficient solutions.
C203.2	Able to analyze characteristics of linear data structure and design social networking and Maps applications.
C203.3	Able to design and implement solutions for different problems using various types of linked list.
C203.4	Apply and implement concept of stack for non-recursive function, expression conversion and evaluation.
C203.5	Choose and Implement different queue according to application.
C203.6	Implement different searching and sorting algorithm.
COA	C204 Year of Study:2019-20(SEM-I)
C204.1	Able to design optimally functional units of ALU by analyzingStructure ,function and storage representation and performance of computer system
C204.2	Able to design cache memory and analyze performance characteristics of memory hierarchy.
C204.3	Able to evaluate I/O interfacing techniques to microprocessor
C204.4	Able to create assembly language program for microprocessor system
C204.5	Able to evaluate various design alternatives of processor organization
C204.6	Able to evaluate various design alternatives of control unit
OOP	C205 Year of Study:2019-20(SEM-I)
C205.1	Understand & Analyze concepts of Object Oriented Programming
C205.2	Apply OOP principles for effective programming
C205.3	Develop programming application using Virtual Function.
C205.4	Apply concept of Templates &Exception handling to develop programming
C205.5	Understand concept of Data hierarchy & Files- streams
C205.6	Understand concept of STL & develop Algorithm for Searching-Sorting
DEL LAB	C206 Year of Study:2019-20(SEM-I)
C206.1	1.Design and implement Boolean Algebraic assignments and Combinational digital

	circuits as per the specifications.
C206.2	2. Design and implement Sequential digital circuits as per the specifications.
C206.3	3. Construct ASM Chart and Design the minimum systems using VHDL
C206.4	4.Designing Combinational Circuits and Sequential Circuits using PLD's
C206.5	5. Apply the knowledge to select the logic families IC packages as per the design specifications
C206.6	6. Develop minimum embedded system for simple real world application
DSL LAB	C207 Year of Study:2019-20(SEM-I)
C207.1	Able to analyze different problems and Apply algorithmic strategy for efficient solutions.
C207.2	Able to analyze characteristics of linear data structure and design social networking and Maps applications.
C207.3	Able to design and implement solutions for different problems using various types of linked list.
C207.4	Apply and implement concept of stack for non-recursive function, expression conversion and evaluation.
C207.5	Choose and Implement different queue according to application.
C207.6	Implement different searching and sorting algorithm.
OOP LAB	C208 Year of Study:2019-20(SEM-I)
C208.1	Understand & Analyze concepts of Object Oriented Programming
C208.2	Apply OOP principles for effective programming
C208.3	Develop programming application using Virtual Function.
C208.4	Apply concept of Templates &Exception handling to develop programming
C208.5	Understand concept of Data hierarchy & Files- streams
C208.6	Understand concept of STL & develop Algorithm for Searching-Sorting
Soft Skills	C209 Year of Study:2019-20(SEM-I)
C209.1	Effectively communicate through verbal/oral communication and improve the listening skills
C209.2	Write precise briefs or reports and technical documents.
C209.3	Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
C209.4	Become more effective individual through goal/target setting, self motivation and practicing creative thinking.
C209.5	Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.
MIII	C210 Year of Study:2019-20(SEM-II)

C210.1	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
C210.2	Solve problems related to Fourier transform, Z-Transform and applications to Signal and Image processing.
C210.3	Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data as applied to machine intelligence.
C210.4	Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals. Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital filters and Computer graphics.
CG	C211 Year of Study:2019-20(SEM-II)
C211.1	To apply concept of geometric, mathematical and algorithmic concepts necessary for programming computer graphics.
C211.2	To apply and implement the concept of polygon filling, windowing and clipping.
C211.3	To design and develop interactive 2D and 3D computer graphics.
C211.4	Design and develop graphics applications using modern tools like 3D Render, 3D Maya in animation, gaming and image processing.
C211.5	Develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics.
C211.6	To develop the competency to understand the concept related to computer vision and virtual reality.
ADS	C212 Year of Study:2019-20(SEM-II)
C212.1	Design and implement solutions for different problems on tree.
C212.2	Apply different data structures to solve problems on graph.
C212.3	Describe and implement the hash function and concepts of collision and its resolution methods.
C212.4	Compare and design dynamic and static trees.
C212.5	Construct heap and multiway trees.
C212.6	Explain and apply various file organizations.
MI	C213 Year of Study:2019-20(SEM-II)
C213.1	Understand and compare architectures of advanced processors and it's resources
C213.2	Apply assembly language programming to develop real time applications
C213.3	Implement parallel processing and math coprocessor
C213.4	Compare different processor configurations
PPL	C214 Year of Study:2019-20(SEM-II)
C214.1	To assimilate the software development process and concept of syntax and semantics of language.
C214.2	To tabulate the different data types and construct the structure of Computation.
C214.3	To explore the different programming paradigms.

C214.4	To interpret the basic of Object Oriented Programming Language.
C214.5	To exhibit the principles Object Oriented Programming using java.
C214.6	To practice the concept of exception handling and Programming paradigms effectively in application development.
CGLab	C215 Year of Study:2019-20(SEM-II)
C215.1	To apply concept of geometric, mathematical and algorithmic concepts necessary for programming computer graphics.
C215.2	To apply and implement the concept of polygon filling, windowing and clipping.
C215.3	To design and develop interactive 2D and 3D computer graphics.
C215.4	Design and develop graphics applications using modern tools like 3D Render, 3D Maya in animation, gaming and image processing.
C215.5	Develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics.
C215.6	To develop the competency to understand the concept related to computer vision and virtual reality.
ADS Lab	C216 Year of Study:2019-20(SEM-II)
C216.1	Design and implement solutions for different problems on tree.
C216.2	Apply different data structures to solve problems on graph.
C216.3	Describe and implement the hash function and concepts of collision and its resolution methods.
C216.4	Compare and design dynamic and static trees.
C216.5	Construct heap and multiway trees.
C216.6	Explain and apply various file organizations.
MIL Lab	C217 Year of Study:2019-20(SEM-II)
C217.1	Understand and compare architectures of advanced processors and it's resources
C217.2	Apply assembly language programming to develop real time applications
C217.3	Implement parallel processing and math coprocessor
C217.4	Compare different processor configurations

Master of Business Administration (MBA) –
Revised Syllabus 2019

1.0MBA Programme Focus:

1.1Programme Educational Objectives (PEOs):

1. **PEO1:** Graduates of the MBA program will successfully integrate core, cross-functional and inter-disciplinary aspects of management theories, models and frameworks with the real world practices and the sector specific nuances to provide solutions to real world business, policy and social issues in a dynamic and complex world.
2. **PEO2:** Graduates of the MBA program will possess excellent communication skills, excel in cross-functional, multi- disciplinary, multi-cultural teams, and have an appreciation for local, domestic and global contexts so as to manage continuity, change, risk, ambiguity and complexity.
3. **PEO3:** Graduates of the MBA program will be appreciative of the significance of Indian ethos and values in managerial decision making and exhibit value centered leadership.
4. **PEO4:** Graduates of the MBA program will be ready to engage in successful career pursuits covering a broad spectrum of areas in corporate, non-profit organizations, public policy, entrepreneurial ventures and engage in life- long learning.
5. **PEO5:** Graduates of the MBA program will be recognized in their chosen fields for their managerial competence, creativity & innovation, integrity & sensitivity to local and global issues of social relevance and earn the trust & respect of others as inspiring, effective and ethical leaders, managers, entrepreneurs, intrapreneurs and change agents.

1.2 Programme Outcomes (POs): At the end of the MBA programme the learner will possess the

1. **Generic and Domain Knowledge -** Ability to articulate, illustrate, analyze, synthesize and apply the knowledge of principles and frameworks of management and allied domains to the solutions of real-world complex business issues
2. **Problem Solving & Innovation** - Ability to Identify, formulate and provide innovative solution frameworks to real world complex business and social problems by systematically applying modern quantitative and qualitative problem solving tools and techniques.
3. **Critical Thinking** - Ability to conduct investigation of multidimensional business problems using research based knowledge and research methods to arrive at data driven decisions
4. **Effective Communication** - Ability to effectively communicate in cross-cultural settings, in technology mediated environments, especially in the business context and with society at large
5. **Leadership and Team Work** - Ability to collaborate in an organizational context and across organizational boundaries and lead themselves and others in the achievement of organizational goals and optimize outcomes for all stakeholders.
6. **Global Orientation and Cross-Cultural Appreciation:** Ability to approach any relevant business issues from a global perspective and exhibit an appreciation of Cross Cultural aspects of business and management.
7. **Entrepreneurship** - Ability to identify entrepreneurial opportunities and leverage managerial & leadership skills for founding, leading & managing startups as well as professionalizing and growing family businesses.
8. **Environment and Sustainability** - Ability to demonstrate knowledge of and need for sustainable development and assess the impact of managerial decisions and business

priorities on the societal, economic and environmental aspects.

9. **Social Responsiveness and Ethics** - Ability to exhibit a broad appreciation of the ethical and value underpinnings of managerial choices in a political, cross-cultural, globalized, digitized, socio-economic environment and distinguish between ethical and unethical behaviors & act with integrity.
10. **LifeLong Learning** – Ability to operate independently in new environment, acquire new knowledge and skills and assimilate them into the internalized knowledge and skills.

1.3 Programme Specific Outcomes (PSOs):

1. After studying for 2years, the students get the theoretical as well as practical knowledge about the different aspects of the business perspectives which prepare them to work in the government and private organizations at executive, middle and top level posts.
2. Students can work in various functional areas like Marketing, Finance, Human Resource Management, Agri-business, and Operations Management
3. Students are able to work in various industries like manufacturing, service, retail, telecommunication, automobile, banking and finance etc.

1.4 Graduate Attributes (GAs): At the end of the MBA programme the learner shall exhibit: GA1: Managerial competence
GA2: Proficiency in Communication, Collaboration, Teamwork and LeadershipGA3: Competence in Creativity & Innovation
GA4: Research Aptitude, Scholarship & EnquiryGA5: Global Orientation
GA6: Proficiency in ICT & Digital Literacy
GA7: Entrepreneurship & Intrapreneurship OrientationGA8: Cross-functional & Inter-disciplinary Orientation GA9: Results Orientation
GA10: Professionalism, Ethical, Values Oriented & Socially Responsible behaviourGA11: Life-Long Learning Orientation

MBA I (Sem I)

Semester I		**101 – Managerial Accounting**
3 Credits	**LTP: 2:1:1**	**Compulsory Generic Core Course**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO101.1	REMEMBERING	DESCRIBE the basic concepts related to Accounting, Financial Statements, Cost Accounting, Marginal Costing, Budgetary Control and Standard Costing
CO101.2	UNDERSTANDING	EXPLAIN in detail, all the theoretical concepts taught through the syllabus.
CO101.3	APPLYING	PERFORM all the necessary calculations through the relevant numerical problems.
CO101.4	ANALYSING	ANALYSE the situation and decide the key financial as well as non-financial elements involved in the situation.
CO101.5	EVALUATING	EVALUATE the financial impact of the decision.

Semester I		102 - Organizational Behaviour
3 Credits	LTP: 2:1:1	Compulsory Generic Core Course

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO102.1	REMEMBERING	DESCRIBE the major theories, concepts, terms, models, frameworks and research findings in the field of organizational behavior.
CO102.2	UNDERSTANDING	EXPLAIN the implications of organizational behavior from the perspectives of employees, managers, leaders and the organization.
CO102.3	APPLYING	MAKE USE OF the Theories, Models, Principles and Frameworks of organizational behavior in specific organizational settings.
CO102.4	ANALYSING	DECONSTRUCT the role of individual, groups, managers and leaders in influencing how people behave and in influencing organizational culture atlarge.
CO102.5	EVALUATING	FORMULATE approaches to reorient individual, team, managerial and leadership behaviour inorder to achieve organizational goals.
CO102.6	CREATING	ELABORATE UPON the challenges in shaping organizational behavior, organizational culture and organizational change.

Semester I		103 – Economic Analysis for Business Decisions
3 Credits	LTP: 2:1:1	Compulsory Generic Core Course

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO103.1	REMEMBERING	DEFINE the key terms in micro-economics.
CO103.2	UNDERSTANDING	EXPLAIN the key terms in micro-economics, from a managerial perspective.
CO103.3	APPLYING	IDENTIFY the various issues in an economics context and DEMONSTRATE their significance from the perspective of business decision making.
CO103.4	ANALYSING	EXAMINE the inter-relationships between various facets of micro-economics from the perspective of a consumer, firm, industry, market, competition and business cycles.
CO103.5	EVALUATING	DEVELOP critical thinking based on principles of micro-economics for informed business decision making.
CO103.6	CREATING	ANTICIPATE how other firms in an industry and consumers will respond to economic decisions made by a business, and how to incorporate these responses into their own decisions.

Semester I		104 - Business Research Methods
3 Credits	LTP: 2:1:1	Compulsory Generic Core Course

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO104.1	REMEMBERING	DEFINE various concepts & terms associated with scientific businessresearch.
CO104.2	UNDERSTANDING	EXPLAIN the terms and concepts used in all aspects of scientific business research.
CO104.3	APPLYING	MAKE USE OF scientific principles of research to SOLVE contemporary business research problems.

CO104.4	ANALYSING	EXAMINE the various facets of a research problem and ILLUSTRATE the relevant aspects of the research process from a data driven decision perspective.
CO104.5	EVALUATING	JUDGE the suitability of alternative research designs, sampling designs, data collection instruments and data analysis options in the context of a given real-life business research problem from a data driven decision perspective.
CO104.6	CREATING	FORMULATE alternative research designs, sampling designs, data collection instruments, testable hypotheses, data analysis strategies and research reports to address real-life business research problems.

Semester I		**105 – Basics of Marketing**
3 Credits	**LTP: 2:1:1**	**Compulsory Generic Core Course**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO105.1	REMEMBERING	RECALL and REPRODUCE the various concepts, principles, frameworks and terms related to the function and role of marketing.
CO105.2	UNDERSTANDING	DEMONSTRATE the relevance of marketing management concepts and frameworks to a new or existing business across wide variety of sectors and ILLUSTRATE the role that marketing plays in the 'tool kit' of every organizational leader and manager.
CO105.3	APPLYING	APPLY marketing principles and theories to the demands of marketing function and practice in contemporary real world scenarios.
CO105.4	ANALYSING	EXAMINE and LIST marketing issues pertaining to segmentation, targeting and positioning, marketing environmental forces, consumer buying behavior, marketing mix and Product Life Cycle in the context of real worldmarketing offering (commodities, goods, services, e-products/ e-services).
CO105.5	EVALUATING	EXPLAIN the interrelationships between segmentation, targeting and positioning, marketing environment, consumer buying behavior, marketing mix and Product Life Cycle with real world examples.
CO105.6	CREATING	DISCUSS alternative approaches to segmentation, targeting and positioning,the marketing environment, consumer buying behavior, marketing mix and Product Life Cycle in the context of real world marketing offering (commodities, goods, services, e-products/ e-services.).

Semester I		**106 – Digital Business**
3 Credits	**LTP: 2:1:1**	**Compulsory Generic Core Course**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO106.1	REMEMBERING	DESCRIBE the conceptual framework of e commerce, mobile commerce and social commerce.
CO106.2	UNDERSTANDING	SUMMARIZE the impact of information, mobile, social, digital, IOT and related technologies on society, markets & commerce.
CO106.3	APPLYING	ILLUSTRATE value creation & competitive advantage in a digital Business environment.
CO106.4	ANALYSING	EXAMINE the changing role of intermediaries, changing nature of supply chain and payment systems in the online and offline world.
CO106.5	EVALUATING	ELABORATE upon the various types of digital business models and OUTLINE

		their benefits and limitations.
CO106.6	CREATING	DISCUSS the various applications of Digital Business in the present day world.

Semester I		**107 – Management Fundamentals**
2 Credits	**LTP: 2:0:0**	**Generic Elective – University Level**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO107.1	REMEMBERING	ENUMERATE various managerial competencies and approaches to management.
CO107.2	UNDERSTANDING	EXPLAIN the role and need of Planning, Organizing, Decision Making and Controlling.
CO107.3	APPLYING	MAKE USE OF the principles of goal setting and planning for simple as well as complex tasks and small projects.
CO107.4	ANALYSING	COMPARE and CONTRAST various organizational structures of variety of businessand not-for-profit entities in a real world context.
CO107.5	EVALUATING	BUILD a list of the decision making criteria used by practicing managers, leaders and entrepreneurs in routine and non-routine decision making situations and EVALUATE and EXPLAIN the same.
CO107.6	CREATING	FORMULATE and DISCUSS a basic controlling model in a real life business, start-up and not-for-profit organizational context.

Semester I		**109 – Entrepreneurship Development**
2 Credits	**LTP: 2:0:0**	**Generic Elective – University Level**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO109.1	REMEMBERING	DEFINE the key terms, LIST the Attributes and Characteristics of Entrepreneurs features and ENUMERATE the Factors influencing Entrepreneurship Growth.
CO109.2	UNDERSTANDING	DISCUSS various theories of entrepreneurship and the entrepreneurship development ecosystem in Indian context.
CO109.3	APPLYING	APPLY the theories of entrepreneurship and entrepreneurship development framework to analyze and identify entrepreneurial opportunities.
CO109.4	ANALYSING	DISCRIMINATE between potential options available for entrepreneur for embarking on establishing a Start Up
CO109.5	EVALUATING	EVALUATE the start up ecosystem and the entrepreneurial opportunities in light of requirements of a business plan.
CO109.6	CREATING	CREATE a business plan that captures entrepreneurs and variety of entrepreneur motivations, entrepreneur culture and sectoral opportunities and financing options.

Semester I		**110 – Essentials of Psychology for Managers**
2 Credits	**LTP: 2:0:0**	**Generic Elective – University Level**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE	COURSE OUTCOMES

	ABILITIES	
CO110.1	REMEMBERING	DEFINE the basic concepts of psychology.
CO110.2	UNDERSTANDING	EXPLAIN the sensing and perceiving processes.
CO110.3	APPLYING	APPLY principles of learning and conditioning to human behavior.
CO110.4	ANALYSING	ILLUSTRATE the linkages between learning, memory and information processing.
CO110.5	EVALUATING	EXPLAIN the basic intrapersonal processes that influence social perception.

Semester I		**113 - Verbal Communication Lab**
2 Credits	**LTP: 0:3:1**	**Generic Elective – Institute Level**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO113.1	REMEMBERING	RECOGNIZE the various elements of communication, channels of communication and barriers to effective communication.
CO113.2	UNDERSTANDING	EXPRESS themselves effectively in routine and special real world business interactions.
CO113.3	APPLYING	DEMONSTRATE appropriate use of body language.
CO113.4	ANALYSING	TAKE PART IN professional meetings, group discussions, telephonic calls, elementary interviews and public speaking activities.
CO113.5	EVALUATING	APPRAISE the pros and cons of sample recorded verbal communications in a business context.
CO113.6	CREATING	CREATE and DELIVER effective business presentations, using appropriate technology tools, for common business situations.

Semester I		**115 - Selling & Negotiations Skills Lab**
2 Credits	**LTP: 0:3:1**	**Generic Elective – Institute Level**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO115.1	REMEMBERING	DESCRIBE the various selling situations and selling types.
CO115.2	UNDERSTANDING	OUTLINE the pre-sales work to be carried out by a professional salesperson.
CO115.3	APPLYING	IDENTIFY the key individuals involved in a real world sales process for a real world product/ service / e-product / e-service.
CO115.4	ANALYSING	FORMULATE a sales script for a real world sales call for a product/ service / e-product / e-service.
CO115.5	EVALUATING	DECONSTRUCT the pros and cons of sample real world sales calls for a product/service / e-product / e-service.
CO115.6	CREATING	DEVELOP a sales proposal for a real world product/ service / e-product / e-service and for a real world selling situation.

Semester I		**116 - MS Excel**

2 Credits	LTP: 0:3:1	Generic Elective – Institute Level

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO116.1	REMEMBERING	SELECT appropriate menus and functions of MS Excel to Create, Format, Import, Merge, Save, Print Spreadsheets & Charts using business data.
CO116.2	UNDERSTANDING	SHOW how to do basic troubleshooting and fix mistakes most people make when working with spreadsheets.
CO116.3	APPLYING	USE various functions of MS Excel, Execute pivot table analysis, common (and powerful functions), and different types of lookups (vlookup, hlookup, and index/match).
CO116.4	ANALYSING	ILLUSTRATE the use of the most commonly used data-manipulation commands in MS Excel.
CO116.5	EVALUATING	DERIVE insights from multiple data sources in MS EXCEL and work with it to answer relevant business questions.
CO116.6	CREATING	CREATE standard Excel Templates for routine business data management and analysis activities.

MBA I (Sem II)

Semester II		201 – Marketing Management
3 Credits	LTP: 2:1:1	Compulsory Generic Core Course

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO201.1	REMEMBERING	DESCRIBE the key terms associated with the 4 Ps of marketing.
CO201.2	UNDERSTANDING	COMPARE and CONTRAST various approaches to pricing for a real world marketing offering (commodities, goods, services, e-products/ e-services.)
CO201.3	APPLYING	DEMONSTRATE an understanding of various channel options for a real world marketing offering (commodities, goods, services, e-products/ e-services.)
CO201.4	ANALYSING	EXAMINE the product line of a real world marketing offering (commodities, goods, services, e-products/ e-services.)
CO201.5	EVALUATING	EXPLAIN the role of various communication mix elements for a real world marketing offering (commodities, goods, services, e-products/ e-services.)
CO201.6	CREATING	DESIGN a marketing plan for a real world marketing offering (commodities, goods, services, e-products/ e-services.)

Semester II		202 – Financial Management
3 Credits	LTP: 2:1:1	Compulsory Generic Core Course

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO202.1	REMEMBERING	DESCRIBE the basic concepts related to Financial Management, Various techniques of Financial Statement Analysis, Working Capital, Capital Structure, Leverages and Capital Budgeting.
CO202.2	UNDERSTANDING	EXPLAIN in detail all theoretical concepts throughout the syllabus
CO202.3	APPLYING	PERFORM all the required calculations through relevant numerical problems.
CO202.4	ANALYSING	ANALYZE the situation and • comment on financial position of the firm • estimate working capital required • decide ideal capital structure • evaluate various project proposals
CO202.5	EVALUATING	EVALUATE impact of business decisions on Financial Statements, Working Capital, Capital Structure and Capital Budgeting of the firm

Semester II		203 – Human Resource Management
3 Credits	LTP: 2:1:1	Compulsory Generic Core Course

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE	COURSE OUTCOMES

	ABILITIES	
CO203.1	REMEMBERING	DESCRIBE the role of Human Resource Function in an Organization.
CO203.2	REMEMBERING	ENUMERATE the emerging trends and practices in HRM.
CO203.3	UNDERSTANDING	ILLUSTRATE the different methods of HR Acquisition and retention.
CO203.4	APPLYING	DEMONSTRATE the use of different appraisal and training methods in an Organization.
CO203.5	ANALYSING	OUTLINE the compensation strategies of an organization
CO203.6	EVALUATING	INTERPRET the sample job descriptions and job specifications for contemporary entry level roles in real world organizations.

Semester II		**204 – Operations & Supply Chain Management**
3 Credits	**LTP: 2:1:1**	**Compulsory Generic Core Course**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO204.1	REMEMBERING	DEFINE basic terms and concepts related to Production, Operations, Services, Supply Chain and Quality Management.
CO204.2	UNDERSTANDING	EXPLAIN the process characteristics and their linkages with process-product matrix in a real world context.
CO204.3	APPLYING	DESCRIBE the various dimensions of production planning and control and theirinter-linkages with forecasting.
CO204.4	ANALYSING	CALCULATE inventory levels and order quantities and MAKE USE OF various inventory classification methods.
CO204.5	EVALUATING	OUTLINE a typical Supply Chain Model for a product / service and ILLUSTRATE the linkages with Customer Issues, Logistic and Business Issues in a real world context.
CO204.6	CREATING	ELABORATE upon different operational issues in manufacturing and services organisations where the decision-making element is emphasized.

Semester II		**207 – Contemporary Frameworks in Management**
2 Credits	**LTP: 2:0:0**	**Generic Elective – University Level**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO207.1	REMEMBERING	DEFINE Emotional Intelligence (EQ), IDENTIFY the benefits of emotional intelligence and RELATE the 5 Dimensions of Trait EI Model to the practice of emotional intelligence.
CO207.2	UNDERSTANDING	DESCRIBE how companies achieve transition from being good companies to great companies, and DISCUSS why and how most companies fail to make the transition.
CO207.3	APPLYING	APPLY the 21 laws that make leadership work succesfully to improve your leadership ability and ILLUSTRATE its positive impact on the whole organization.
CO207.4	ANALYSING	EXAMINE the fundamental causes of organizational politics and team failure.
CO207.5	EVALUATING	EXPLAIN the approach to being effective in attaining goals by aligning oneself to the "true north" principles based on a universal and timeless character ethic.

Semester II		**209 - Start Up and New Venture Management**

2 Credits	**LTP: 2:0:0**	**Generic Elective – University Level**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO209.1	REMEMBERING	DESCRIBE the strategic decisions involved in establishing a startup.
CO209.2	UNDERSTANDING	EXPLAIN the decision making matrix of entrepreneur in establishing a startup.
CO209.3	APPLYING	IDENTIFY the issues in developing a team to establish and grow a startup
CO209.4	ANALYSING	FORMULATE a go to market strategy for a startup.
CO209.5	EVALUATING	DESIGN a workable funding model for a proposed startup.
CO209.6	CREATING	DEVELOP a convincing business plan description to communicate value of the new venture to customers, investors and other stakeholders.

Semester II		**210 – Qualitative Research Methods**
2 Credits	**LTP: 2:0:0**	**Generic Elective – University Level**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOME
CO210.1	REMEMBERING	ENUMERATE the key terms associated with Qualitative research approach.
CO210.2	UNDERSTANDING	COMPARE and CONTRAST Qualitative research approach with the Quantitativeapproach.
CO210.3	APPLYING	CONSTRUCT appropriate research and sampling designs for Qualitative research work in real world business and non-business contexts
CO210.4	ANALYSING	ILLUSTRATE the use of appropriate qualitative research methods in real world business and non-business contexts.
CO210.5	EVALUATING	EVALUATE the quality of Qualitative Research work
CO210.6	CREATING	COMBINE Qualitative and Quantitative research approaches in a real world research project.

Semester II		**214 - Industry Analysis - Desk Research**
2 Credits	**LTP: 0:3:1**	**Generic Elective – Institute Level**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO214.1	REMEMBERING	DESCRIBE the key characteristics of the players in an industry.
CO214.2	UNDERSTANDING	SUMMARIZE the management ethos and philosophy of the players in the industry.
CO214.3	APPLYING	DEMONSTRATE an understanding of the regulatory forces acting on the industry.
CO214.4	ANALYSING	COMPARE and CONTRAST, using tables and charts, the market and financial performance of the players in an industry.
CO214.5	EVALUATING	ASSESS the impact of recent developments on the industry and its key players.
CO214.6	CREATING	PREDICT the future trajectory of the evolution of the industry in the immediate future (1 to 3 years).

Specialization: Marketing Management

Semester II		**205MKT: Marketing Research**
3 Credits	**LTP: 2:1:1**	**Subject Core (SC) Course – Marketing Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO205MKT.1	REMEMBERING	IDENTIFY and DESCRIBE the key steps involved in the marketing research process.
CO205MKT.2	UNDERSTANDING	COMPARE and CONTRAST various research designs, data sources, data collection instruments, sampling methods and analytical tools and SUMMARIZE their strengths & weaknesses.
CO205MKT.3	APPLYING	DEMONSTRATE an understanding of the ethical framework that market research needs to operate within.
CO205MKT.4	ANALYSING	ANALYSE quantitative data and draw appropriate Inferences to address a real life marketing issue.
CO205MKT.5	EVALUATING	DESIGN a market research proposal for a real life marketing research problem and EVALUATE a market research proposal.
CO205MKT.6	CREATING	PLAN and UNDERTAKE qualitative or quantitative Market Research and demonstrate the ability to appropriately analyse data to resolve a real life marketing issue.

Semester II		**206MKT: Consumer Behavior**
3 Credits	**LTP: 2:1:1**	**Subject Core (SC) Course – Marketing Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO206MKT.1	REMEMBERING	ENUMERATE social and psychological factors and their influence his/her behavior as a consumer.
CO206MKT.2	UNDERSTANDING	EXPLAIN fundamental concepts associated with consumer and organizational buying behavior.
CO206MKT.3	APPLYING	APPLY consumer behavior concepts to real world strategic marketing management decision making.
CO206MKT.4	ANALYSING	ANALYSE the dynamics of human behavior and the basic factors that influence the consumer's decision process.
CO206MKT.5	EVALUATING	EXPLAIN the consumer and organizational buying behavior process for a variety of products (goods/services).
CO206MKT.6	CREATING	DISCUSS the use of the Internet, e-commerce & information technology with respect to the changing consumer marketplace and ELABORATE on the various aspects of the changing Indian Consumer.

Semester II		**217MKT: Integrated Marketing Communications**
2 Credits	**LTP: 1:1:1**	**Subject Elective (SE) Course – Marketing Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO217MKT.1	REMEMBERING	DESCRIBE the IMC mix and the IMC planning process.
CO217MKT.2	UNDERSTANDING	EXAMINE the role of integrated marketing communications in building brand identity, brand equity, and customer franchise.
CO217MKT.3	APPLYING	CONSTRUCT a marketing communications mix to achieve the communications and behavioural objectives of the IMC campaign plan.
CO217MKT.4	ANALYSING	ANALYZE and critically evaluate the communications effects and results of an IMC campaign to determine its success for a variety of brands.
CO217MKT.5	EVALUATING	DESIGN a sales promotion campaign and CHOOSE the avenues for Public Relations, Publicity and Corporate Advertising for a consumer and abusiness-

		to-business product.
CO217MKT.6	CREATING	DEVELOP an integrated cross-media strategy and creative message and concept to reach the target audience and deliver the brand promise through an IMC campaign for a variety of brands.

Semester II		**218MKT: Product and Brand Management**
2 Credits	**LTP: 1:1:1**	**Subject Elective (SE) Course – Marketing Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO218MKT.1	REMEMBERING	DEFINE the key concepts and DESCRIBE the elements of a product strategy.
CO218MKT.2	UNDERSTANDING	EXPLAIN the process and methods of brand management, including how to establish brand identity and build brand equity.
CO218MKT.3	APPLYING	IDENTIFY the Brand Marketing Strategies for Leaders, Challengers, Followers and Niche Strategies for real life consumer, business products and services operating in various markets and in the digital space.
CO218MKT.4	ANALYSING	EXAMINE the key brand concepts by articulating the context of and the rationale of application for real life consumer, business products and services operating in various markets and in the digital space.
CO218MKT.5	EVALUATING	FORMULATE effective branding strategies for real life consumer, business products and services operating in various markets and in the digital space.
CO218MKT.6	CREATING	COLLECT brand audit data using appropriate tools and PROPOSE strategic recommendations for Reinforcing / Revitalizing / Rejuvenating failed Brands for real life consumer, business products and services in various markets and in the digital space.

Specialization: Financial Management

Semester II		**205FIN: Financial Markets and Banking Operations**
3 Credits	**LTP: 2:1:1**	**Subject Core (SC) Course – Financial Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO205FIN.1	REMEMBERING	RECALL the structure and components of Indian financial system throughbanking operations & Financial Markets.
CO205FIN.2	UNDERSTANDING	UNDERSTAND the concepts of financial markets, their working and importance.
CO205FIN.3	APPLYING	ILLUSTRATE the working and contribution of Banks and NBFCs to the Indian Economy.
CO205FIN.4	ANALYSING	ANALYZE the linkages in the Financial Markets.
CO205FIN.5	EVALUATING	EXPLAIN the various banking and accounting transactions.
CO205FIN.6	CREATING	DEVELOP necessary competencies expected of a finance professional.

Semester II		**206FIN: Personal Financial Planning**
3 Credits	**LTP: 2:1:1**	**Subject Core (SC) Course – Financial Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES

CO206FIN.1	REMEMBERING	UNDERSTAND the need and aspects of personal financial planning
CO206FIN.2	UNDERSTANDING	Describe the investment options available to an individual
CO206FIN.3	APPLYING	IDENTIFY types of risk and means of managing it
CO206FIN.4	ANALYSING	DETERMINE the ways of personal tax planning
CO206FIN.5	EVALUATING	EXPLAIN retirement and estate planning for an individual and design a financial plan.
CO206FIN.6	CREATING	CREATE a financial plan for a variety of individuals.

Semester II		**217FIN: Securities Analysis & Portfolio Management**
2 Credits	**LTP: 0:3:1**	**Subject Elective (SE) Course – Financial Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO217FIN.1	REMEMBERING	REMEMBER various concepts taught in the syllabus.
CO217FIN.2	UNDERSTANDING	EXPLAIN various theories of Investment Analysis and Portfolio Management.
CO217FIN.3	APPLYING	CALCULATE risk and return on investment using various concepts coveredin the syllabus.
CO217FIN.4	ANALYSING	ANALYZE and DISCOVER intrinsic value of a security.
CO217FIN.5	EVALUATING	DESIGN/ CREATE optimal portfolio.

Semester II		**219FIN: Direct Taxation**
2 Credits	**LTP: 0:3:1**	**Subject Elective (SE) Course – Financial Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO219FIN.1	REMEMBERING	UNDERSTAND various basic concepts/ terminologies related Direct Taxation
CO219FIN.2	UNDERSTANDING	EXPLAIN how tax planning can be done.
CO219FIN.3	UNDERSTANDING	ILLUSTRATE how online filling of various forms and returns can be done.
CO219FIN.4	APPLYING	CALCULATE Gross Total Income and Income Tax Liability of an individual assesse.
CO219FIN.5	ANALYSING	ANALYZE and DISCOVER intrinsic value of a security.
	EVALUATING	DESIGN/ DEVELOP / CREATE tax saving plan.

Specialization: Human Resource Management

Semester II		**205HRM: Competency Based Human Resource Management System**
3 Credits	**LTP: 2:1:1**	**Subject Core (SC) Course – Human Resource Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO205HRM.1	REMEMBERING	DEFINE the key terms related to performance management and competency development.
CO205HRM.2	UNDERSTANDING	EXPLAIN various models of competency development.
CO205HRM.3	APPLYING	PRACTICE competency mapping.

CO205HRM.4	ANALYSING	ANALYSE competencies required for present and potential future job roles at various levels and across variety of organizations.
CO205HRM.5	EVALUATING	DESIGN and MAP their own competency and plan better and appropriate career for themselves.
CO205HRM.6	CREATING	DEVELOP a customized competency model in accordance with the corporate requirements.

Semester II		**206HRM: Employee Relations and Labour Legislations**
3 Credits	**LTP: 2:1:1**	**Subject Core (SC) Course – Human Resource Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO206HRM.1	REMEMBERING	SHOW awareness of important and critical issues in Employee Relations
CO206HRM.2	UNDERSTANDING	INTERPRET and relate legislations governing employee relations.
CO206HRM.3	APPLYING	DEMONSTRATE an understanding of legislations relating to working environment.
CO206HRM.4	ANALYSING	OUTLINE the role of government, society and trade union in ER.
CO206HRM.5	EVALUATING	EXPLAIN aspects of collective bargaining and grievance handling.
CO206HRM.6	CREATING	DISCUSS the relevant provisions of various Labour Legislations.

Semester II		**218HRM: Lab in Recruitment and Selection**
2 Credits	**LTP: 0:3:1**	**Subject Elective (SE) Course – Human Resource Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO218HRM.1	REMEMBERING	DESCRIBE the key concepts such as Job Specification, Job description,Recruitment and Selection.
CO218HRM.2	UNDERSTANDING	COMPARE and CONTRAST various methods of Recruitment and Selection.
CO218HRM.3	APPLYING	DEVELOP Job Specifications and Job descriptions in a variety of context.
CO218HRM.4	ANALYSING	ANALYZE various Personality types.
CO218HRM.5	EVALUATING	EXPLAIN the profiling techniques used to test Personality, Aptitude, Competency.
CO218HRM.6	CREATING	COMPILE a list of questions for Recruitment and Selection interviews.

Semester II		**219HRM: Learning & Development**
2 Credits	**LTP: 0:3:1**	**Subject Elective (SE) Course – Human Resource Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO219HRM.1	REMEMBERING	DESCRIBE the key concepts associated with Learning & Development
CO219HRM.2	UNDERSTANDING	EXPLAIN the training process and the various methods of training for various categories of employees in a variety of organizational contexts.
CO219HRM.3	APPLYING	IDENTIFY training needs of various categories of employees in a variety of organizational contexts.
CO219HRM.4	ANALYSING	EXAMINE the impact of training on various organizational and HR aspects.
CO219HRM.5	EVALUATING	EVALUATE the training process of various categories of employees in avariety of organizational contexts.

CO219HRM.6	CREATING	DESIGN a training programme for various categories of employees in a variety of organizational contexts.

Specialization: Operations & Supply Chain Management

Semester II		**205OSCM: Service Operations Management – I**
3 Credits	**LTP: 2:1:1**	**Subject Core (SC) Course – Operations & Supply Chain Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO205OSCM.1	REMEMBERING	DESCRIBE the nature and CHARACTERISTICS of services and the services economy.
CO205OSCM .2	UNDERSTANDING	DESRCIBE the service design elements of variety of services.
CO205OSCM .3	APPLYING	USE service blueprinting for mapping variety of real life service processes.
CO205OSCM .4	ANALYSING	ANALYSE alternative locations and sites for variety of service facilities.
CO205OSCM .5	EVALUATING	JUDGE and EXPLAIN the service orientation at variety of service facilities / organizations.
CO205OSCM .6	CREATING	CREATE flow process layouts for variety of services.

Semester II		**206OSCM: Supply Chain Management**
3 Credits	**LTP: 2:1:1**	**Subject Core (SC) Course – Operations & Supply Chain Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO206OSCM.1	REMEMBERING	DESCRIBE the key concepts of Supply Chain Management and the – driving forces in contemporary Supply Chain Management.
CO206OSCM.2	UNDERSTANDING	EXPLAIN the structure of modern day supply chains.
CO206OSCM.3	APPLYING	IDENTIFY the various flows in real world supply chains.
CO206OSCM.4	ANALYSING	COMPARE and CONTRAST push and pull strategies in Supply Chain Management.
CO206OSCM.5	EVALUATING	EXPLAIN the key Operational Aspects in Supply Chain Management.
CO206OSCM.6	CREATING	DISCUSS the relationship between Customer Value and Supply Chain Management.

Semester II		**217OSCM: Planning & Control of Operations**
2 Credits	**LTP: 1:1:1**	**Subject Elective (SE) Course – Operations & Supply Chain Management**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO217OSCM.1	REMEMBERING	DESCRIBE the building blocks of Planning & Control of Operations.
CO217OSCM.2	UNDERSTANDING	EXPLAIN the need for aggregate planning and the steps in aggregate planning.
CO217OSCM.3	APPLYING	MAKE USE OF the various forecasting approaches in the context of operations planning process.
CO217OSCM.4	ANALYSING	ILLUSTRATE how capacity planning is done in organizations and its relationship with MRP.
CO217OSCM.5	EVALUATING	EXPLAIN the importance of scheduling in operations management.
CO217OSCM.6	CREATING	CREATE a Bill of Materials.

Semester II		**218OSCM: Productivity Management**

2 Credits	LTP: 1:1:1	Subject Elective (SE) Course – Operations & Supply Chain Management

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO218OSCM.1	REMEMBERING	DEFINE various types of productivity and measures of productivity.
CO218OSCM.2	UNDERSTANDING	DEMONSTRATE the linkages between various measures of productivity.
CO218OSCM.3	APPLYING	APPLY Value Analysis and Value Engineering principles to simple situations related to operations management.
CO218OSCM.4	ANALYSING	APPLY various types of charts and diagrams to carry out work study and method study.
CO218OSCM.5	EVALUATING	DETERMINE the Standard Time using Techniques of Work Measurement.
CO218OSCM.6	CREATING	ELABORATE upon the concepts of JIT, Lean, 5S, TPM, BPR, Six Sigma, World Class manufacturing.

Specialization: Business Analytics

Semester II		205BA: Basic Business Analytics using R
3 Credits	LTP: 2:1:1	Subject Core (SC) Course – Business Analytics

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO205BA.1	REMEMBERING	IDENTIFY opportunities for creating value using business analytics and DESCRIBE the basic concepts in Business Analytics, DATA Science and Business Intelligence.
CO205BA.2	UNDERSTANDING	EXPLAIN the applications of Business Analytics in multiple business domains and scenarios.
CO205BA.3	APPLYING	DEVELOP a thought process to think like a data scientist/business analyst.
CO205BA.4	ANALYSING	ANALYZE data graphically by creating a variety of plots using the appropriatevisualization tools of R.
CO205BA.5	EVALUATING	SELECT the right functions of R for the given analytics task.
CO205BA.6	CREATING	COMBINE various tools and functions of R programming language and use them in live analytical projects in multiple business domains and scenarios.

Semester II		206BA: Data Mining
3 Credits	LTP: 2:1:1	Subject Core (SC) Course – Business Analytics

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO206BA.1	REMEMBERING	DEFINE the key terms associated with Data Mining
CO206BA.2	UNDERSTANDING	EXPLAIN the various aspects of Data
CO206BA.3	APPLYING	APPLY classification models
CO206BA.4	ANALYSING	ANALYSE using clustering models
CO206BA.5	EVALUATING	SELECT appropriate association analysis and anomaly detection tools.
CO206BA.6	CREATING	COMBINE various data mining tools and use them in live analytical projects in business scenarios.

Semester II		217BA: Marketing Analytics
2 Credits	LTP: 1:1:1	Subject Elective (SE) Course – Business Analytics

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO217BA.1	REMEMBERING	DESCRIBE the use of Voice of the Customer data in making data driven marketing decisions.
CO217BA.2	UNDERSTANDING	DEMONSTRATE an understanding of utility theory to measure customer preferences and choices.
CO217BA.3	APPLYING	IDENTIFY what customers' value in a product, and assess what they are willing to pay for it.
CO217BA.4	ANALYSING	ILLUSTRATE the use of various tools and frameworks to solve strategic marketing problems using marketing data.
CO217BA.5	EVALUATING	DETERMINE the most effective target markets.
CO217BA.6	CREATING	DESIGN a study that incorporates the key tools of Marketing Analytics.

Semester II		**218BA: Retailing Analytics**
2 Credits	**LTP: 1:1:1**	**Subject Elective (SE) Course – Business Analytics**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO2018BA.1	REMEMBERING	ENUMERATE the characteristics, opportunities and challenges of New Age Retailing and Digital Consumers.
CO2018BA.2	UNDERSTANDING	UNDERSTAND Consumer Buying Behavior and Trends in new age retailing.
CO2018BA.3	APPLYING	USE various kinds of data for performing Retailing Analytics.
CO2018BA.4	ANALYSING	ILLUSTRATE the use of various tools and frameworks for predictive retail analytics.
CO2018BA.5	EVALUATING	DERIVE a variety of metrics and quantify key outcomes in multiple areas of Retail.
CO2018BA.6	CREATING	BUILD value for Retail and Marketing by deriving Marketing ROI metrics..

Master of Computer Application
Institute Vision Mission

Vision

The vision of the MCA department is to develop the next generation of high quality Information Technology professionals to cater the needs of the IT Industry.

Mission

- **To strive for excellence in development and deployment of computer applications.**
- **Our efforts are to impart quality and value based education to raise satisfaction level of all stakeholders.**
- **To prepare the students to face global challenges.**

MCA Department

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Program Educational Objectives (PEOs)

The educational objectives of Master of Computer Application programme are designed to produce competent IT professionals.

1. Students will be able to develop economically feasible and technically robust software solutions to problems across a broad range of application domains through analysis and design.

2. Students will be able to steer their career productively in software industry, academia, research, entrepreneurial pursuit, government, consulting firms and other IT enabled services.

3. To achieve peer-recognition; as an individual or in a team; by adopting ethics and professionalism and communicate effectively to excel well in cross culture and inter-disciplinary teams.

4. To continue a lifelong professional development in computing that contributes in self and societal growth.

MCA Department

PROGRAMME SPECIFIC OUTCOMES

1	Students will have the ability to understand the principles and working of computer systems to assess the hardware and software aspects of computer systems.
2	Students will have the ability to understand the structure and development methodologies of software system, that possess professional skills and knowledge of software design process.
3	Students will have the ability to use knowledge in various domains to identify research gaps and hence to provide solution to new ideas and innovations.
4	Implement effective business solutions across an organization that demonstrates appropriate consideration of alternative computer technologies, including networks, servers, programming languages and database systems.
5	Develop, analyze and defend solutions to networking and security problems that demonstrate an appropriate balance among security needs, business concerns, confidentiality, availability and system integrity.
6	Develop competence in basic technical subjects in computer applications like Programming Languages, Data Structures, Databases, Operating Systems, Software Engineering.
7	Identify, analyze, formulate and develop computer applications.
8	Use modern computing tools and techniques with confidence.
9	Provide simplest automated solutions to various legacy systems.
10	Map real life scenarios to various theoretical optimal solutions.

MCA Department

COURSE OUTCOMES
Academic year 2019-20
Semester-I

Course Code	University Code	Course	Course Outcomes (COs) statement
	First Year- MCA Dept.		
IT11		Problem Solving using C++	1. Use the algorithm paradigms for problem solving. 2. Develop programs with features of the C++ programming language. 3.Develop simple applications using C++ 4.Develop programs in the UNIX/Linux programming environment.
IT12		Software Engineering using UML	1. Distinguish different process model for a software development. 2. Design software requirements specification solution for a given problem definitions of a software system. 3. Apply software engineering analysis/design knowledge to suggest solutions for simulated problems 4. Recognize and describe current trends in software engineering
IT13		Database Management System	1. Describe the basic concepts of DBMS and various databases used in real applications. 2. Design relational database using E-R model and normalization 3. Demonstrate nonprocedural structural query languages for various database applications. 4. Apply concepts of Object Based Database, XML database and non-relational databases. 5. Explain transaction management and recovery management for real applications.
IT14		Essential of Operating System	1. Understand structure of OS, process management and synchronization. 2. Analyze and design Memory Management. 3. Interpret the mechanisms adopted for file sharing in distributed Applications 4. Conceptualize the components and can do Shell Programming. 5. Know Basic Linux System Administration and Kernel Administration.
BM11		Business Process Domain	1.describe major bases for marketing mix in business 2. describe various functionalities of human resource process 3. Identify existing e-commerce model and payment system , 4. Apply knowledge to evaluate and manage an effective

			supply chain. 5. Understand how customer relations are related to business functions and its importanc to success of Business entity. 6. use various banking and insurance process for business development.

COURSE OUTCOMES

Academic year 2019-20

SEMESTER II

Course Code	University Code	Course	Course Outcomes (COs) statement
	First Year- MCA Dept.		
IT21		Data Structure and Algorithm	1.apply design principles and concepts for Data structure and algorithm 2. summarize searching and sorting techniques 3. describe stack, queue and linked list operation 4. demonstrate the concepts of tree and graphs
IT22		Web Technology	1. Implement interactive web page(s) using HTML, CSS and JavaScript. 2. Build Dynamic web site using server-side PHP Programming and Database connectivity. 3. Design a responsive web site.
MT21		BUSINESS STATISTICS	1.Demonstrate concepts of business statistics (such as measures of central tendency, dispersion, correlation, regression analysis and time series analysis) 2. Students will be able to analyze and apply statistical tools to solve problems. 3. based on the acquired knowledge to interpret the meaning of the calculated statistical indicators 4. Demonstrate concept of index numbers for solving practical problems in business world
IT13		Essentials of Networking	1.Understand the basic concepts of data communication including the key aspects of networking and their interrelationship 2. Understand various protocols such as HTTP, SMTP, POP3, IMAP, FTP, DNS, DHCP and the basic structure of IPv4, IPv6 Address and concept of sub netting with numerical 3. Understand routing concept and working of routing protocols such as RIP, OSPF and BGP 4. Understand various encryption techniques
BM21		Principles and Practices of Management and Organizational Behavior	1.Describe and analyze the interactions between multiple aspects of management. 2. Analyze the role of planning and decision making in Organization 3. Justify the role of leadership qualities, Motivation Group dynamics and Team Building. 4. Compare the controlling process

Second Year (Third Semester)- MCA Dept.			
IT31		Java Programming	1.Understand Basic Concepts of Java and multi-threading.-Understand 2. Demonstrate Collection framework -Apply 3. Develop GUI using AWT and Swing -Apply 4. Develop Java Applications using Socket, RMI – Apply 5. Develop Web application using JSP and Servlet, JDBC with MVC --Apply
IT32		Data Warehouse and Data Mining	1.learn and understand techniques of preprocessing various kinds of data –Understand 2. Understand Data warehouse concepts. - Understand 3. Apply association Mining Techniques on large Data Sets. - Apply 4. Apply classification and clustering Techniques on large Data Sets. - Analyze 5. Understand other approaches of Data mining techniques. - Understand
IT33		Software Testing and Quality Assurance	1.Understand the role of software quality assurance in contributing to the efficient delivery of software solutions –Understand 2. Demonstrate specific software tests with well-defined objectives and targets – Apply 3.Apply the software testing techniques in commercial environments –Apply 4. Construct test strategies and plans for software testing –Analyze 5. Understand the usage of software testing tools for test effectiveness, efficiency and coverage – Understand
IT34		Cloud Computing	1.Describe the concepts of Cloud Computing and its Service Models & Deployment Models – Understand. 2. Classify the types of Virtualization – Understand. 3. Describe the Cloud Management and relate Cloud to SOA – Understand. 4. Interpret Moving application s to of Cloud – Apply. 5. Demonstrate practical implementation of Cloud computing – Apply.
MT31		Probability & Combinatorics	1.Apply counting principles to solve the problems – Apply 2. Apply various mathematical tools to solve problems. –Apply 3. Understand and apply basic probability principles. –Apply 4. Demonstrate the concept of univariate and bivariate random variable – Apply

			5. Understand and illustrate the probability distributions.-Analyze

	Fourth Semester- MCA Dept.		
IT41		Python Programming	1. Understand concepts of python.-Understand 2. Demonstrate the concepts modular programming -Apply 3. Apply the concepts of concurrency control in python -Apply 4. Solve the real life problems using object oriented concepts and python libraries–Apply 5. Demonstrate the concept of IO, Exception Handling, database --Apply
BM-41		Information System and Security Audit	1. Interpret the threats and vulnerabilities from IT system of business software applications. - Apply 2. Understand Information Security Management System (ISMS) for IT system of business -Understand 3. Apply information security policies and standards for business IT System-Apply 4. Discuss various IS controls for Business Continuity and Disaster Recovery of business IT system. -Understand 5. Describe information security audit and understand information security IT governance framework. – Understand
MT-41		Optimization Techniques	1. Understand the role and principles of optimization techniques in business world - Understand 2. Demonstrate specific optimization technique for effective decision making -Apply 3. Apply the optimization techniques in business environments -Apply 4.-Illustrate and infer for the business scenario- Analyze 5.analyze the optimization techniques in strategic planning for optimal gain. - Analyze
IT-42		Essentials of Architectural Framework	1.Understand Basics Fundamentals of Architecture and Framework. (Understand) 2. Understand appropriate Architecture Framework design. (Understand) 3.Select appropriate technical and industry specific frameworks. (Understand) 4. Apply the software development process (Apply) 5. Apply the quality of Architecture (Apply)
IT-43		Knowledge Representation and Artificial Intelligence	1. Develop a basic understanding of AI building blocks presented in intelligent agents- Develop. 2. Choose an appropriate problem solving method and knowledge representation technique – Choose. 3. Apply the different Propositional Logic concepts for knowledge representation-Apply. 4. Analyze and understand the models for reasoning with uncertainty and different planning and learning approaches in the field of Artificial Intelligence – Analyze and understand. 5. Demonstrate awareness and a fundamental understanding of various applications of AI – Demonstrate.

MCA Department

First Year SEMESTER I

Course Code	University Code	Course	Course Outcomes (COs) statement
	First Year-MCA Department		
IT-11		Java Programming	1. Understand Basic Concepts of OOPs, Java, Inheritance, Package. (Understand) 2. Understand Exception handling, arrays and Strings and multi-threading in Java (Understand.) 3. Understand collection framework (Understand) 4. Develop GUI using Abstract Windows Toolkit (AWT) and event handling (Apply) 5. Develop Web application using JSP and Servlet, JDBC (Apply)
IT-12		Data Structure and Algorithms	1.demonstrate linear data structures linked list, stack and queue (apply) 2. implement tree, graph, hash table and heap data structures (apply) 3. apply brute force and backtracking techniques (apply) 4.demonstrate greedy and divide-conquer approaches (apply) 5. implement dynamic programming technique (apply)
IT-13		Object Oriented Software Engineering	1. Distinguish different process model for a software development. (Understand) 2. Design software requirements specification solution for a given problem definitions of a software system. (Analyze) 3. Apply software engineering analysis/design knowledge to suggest solutions for simulated problems (Analyze) 4. Design user interface layout for different types of applications (Apply) 5. Recognize and describe current trends in software engineering (Understand)
IT-14		Operating Systems Concepts	1 Understand structure of OS, process management and synchronization. (Understand) 2. Understand multicore and multiprocessing OS. (Understand) 3. explain Realtime and embedded OS (Understand) 4. understand Windows and Linux OS fundamentals and administration. (Understand) 5. solve shell scripting problems (Apply)

IT-15		Network Technologies	1. Understand the basic concepts of Computer Network, and principle of layering (Understand) 2. Apply the error detection and correction techniques used in data transmission (Apply) 3. Apply IP addressing schemes and sub netting (Apply) 4. Understand the concept of routing protocols, Application layer protocols and Network Security (Understand) 5. Apply the socket programming basics to create a simple chat application (Apply)
MCA Department-(Second Semester)			
IT-21		Python Programming	1. Understand Demonstrate the concepts of python and modular programming. (Understand) 2. Apply the concepts of concurrency control in python (Apply) 3. Solve the real-life problems using object-oriented concepts and python libraries (Apply) 4. Demonstrate the concept of IO, Exception Handling, database (Apply) 5. Analyze the given dataset and apply the data analysis concepts and data visualization. (Analyze)
IT-22		Software Project Management	1. Understand the process of Software Project Management Framework and Apply estimation techniques. (Apply) 2. Learn the philosophy, principles and lifecycle of an agile project. (Understand) 3. Demonstrate Agile Teams and Tools and Apply agile project constraints and trade-offs for estimating project size and schedule (Apply) 4. Explain Project Tracking and Interpretation of Progress Report (Understand) 5. Analyze Problem statement and evaluate User Stories (Analyze)

MT-21		Optimization Techniques	1. Understand the role and principles of optimization techniques in business world (Understand) 2. Demonstrate specific optimization technique for effective decision making (Apply) 3. Apply the optimization techniques in business environments (Apply) 4. Illustrate and infer for the business scenario (Analyze) 5. Analyze the optimization techniques in strategic planning for optimal gain. (Analyze)
IT-23		Advanced Internet Technologies	1. Outline the basic concepts of Advance Internet Technologies (Understand) 2. Design appropriate user interfaces and implements webpage based on given problem Statement (Apply) 3. Implement concepts and methods of NodeJS (Apply) 4. Implement concepts and methods of Angular (Apply) 5. Build Dynamic web pages using server-side PHP programming with Database Connectivity (Apply)
IT-24		Advanced DBMS	1. Describe the core concepts of DBMS and various databases used in real applications (Understand) 2. Design relational database using E-R model and normalization (Apply) 3. Demonstrate XML database and nonprocedural structural query languages for data access (Apply) 4. Explain concepts of Parallel, Distributed and Object-Oriented Databases and their applications (Understand) 5. Apply transaction management, recovery management, backup and security – privacy concepts for database applications (Apply)